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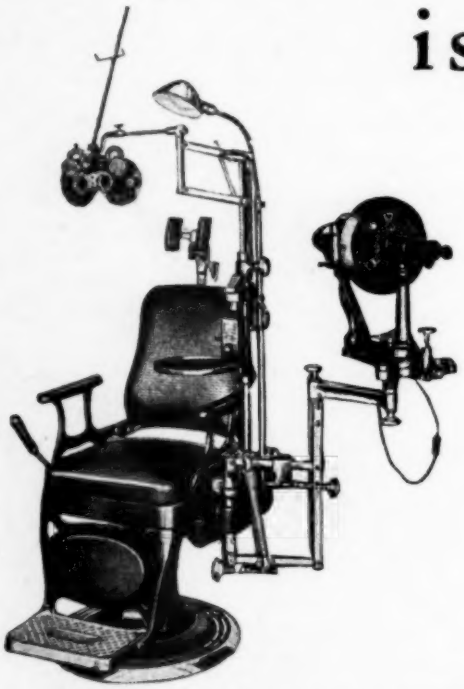

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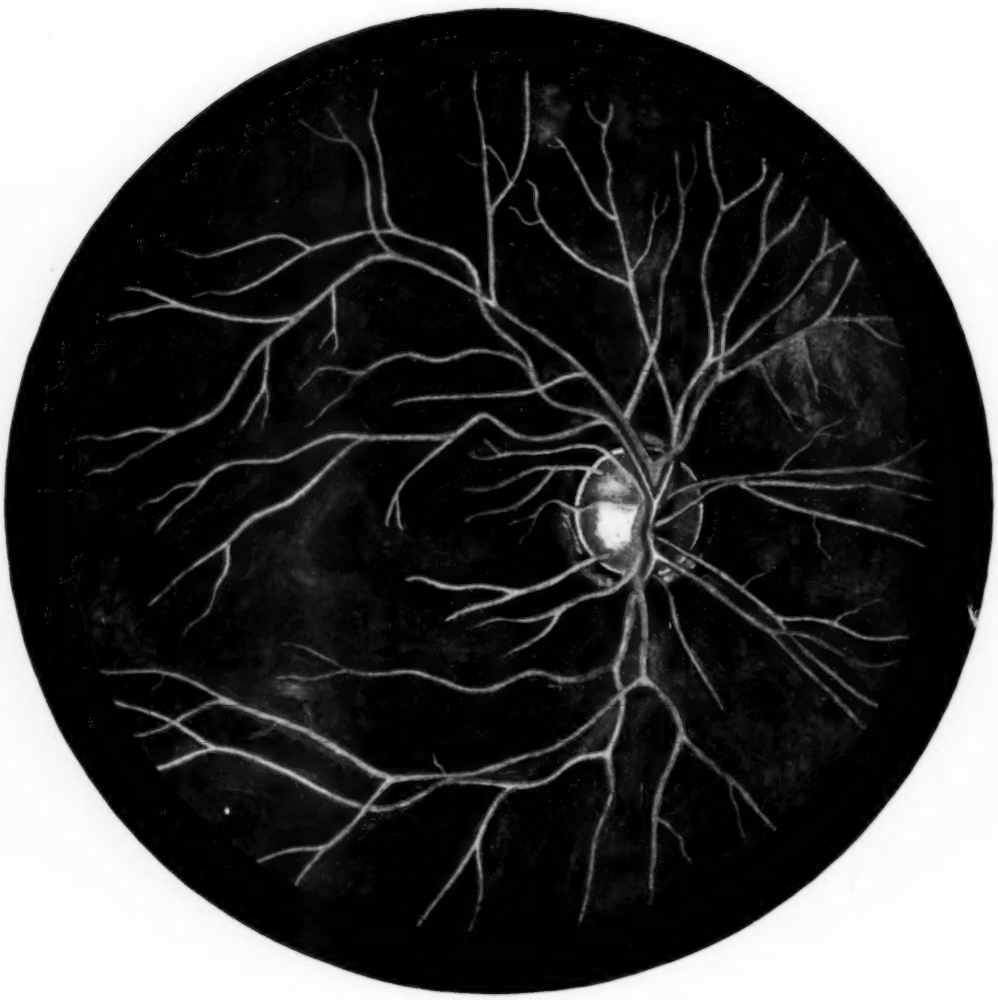

LIPEMIA RETINALIS. (WALTER R. PARKER AND ARTHUR M. CULLER)
AUTHORS' CASE NUMBER ONE

AMERICAN JOURNAL OF OPHTHALMOLOGY

Volume 13 July, 1930 Number 7

LIPEMIA RETINALIS

WALTER R. PARKER, M.D., F.A.C.S., AND ARTHUR M. CULLER, M.C.

DETROIT

With comparative review of the literature as to the various details, two cases of retinal lipemia are reported, in which the relationship of acidosis to the occurrence, disappearance, and recurrence of the phenomenon in the retinal vessels was carefully traced. No disease except diabetes uncomplicated by treatment produces lipemia of sufficient degree to be recognized ophthalmoscopically. Diabetics probably do not show retinal lipemia unless they are in acidosis. Approximately, retinal lipemia occurs when blood fats rise above 3.5 percent, and disappears when the blood fats fall below 2.5 percent. From the department of ophthalmology, University of Michigan.

An effort will be made in this paper to show the relationship of acidosis to the occurrence of lipemia retinalis and to show the level of blood lipids at which a lipemia retinalis is first recognized and at which it disappears. A review of thirty-six cases in the literature will be given, together with the observations made in the study of two cases.

The practice of blood letting early acquainted physicians with the anchovy-sauce appearance of the gross blood in lipemia. Rollo[1] of London, in 1798, and Mariet, of Edinburgh, in 1799, gave the earliest accounts of this condition. The changes in the retina were first described by Heyl[3] , in 1880, who gave it the name "lipemia retinalis". A close association between lipemia and xanthoma has been demonstrated recently by Wile, Curtis, and Eckstein[2]. Lipemia is accompanied by few signs and symptoms and aside from an examination of the blood there is little other evidence of the disease. The paucity of data which might lead to a diagnosis of lipemia throws into sharp relief the striking and characteristic fundus picture, which is seen in severe cases. The diagnosis depends on the ophthalmoscopic appearance of the retinal vessels. The arteries and veins approach a common color, becoming indistinguishable in advanced cases. They are nearly always increased in size (Heyl) and present a flat, ribbon-like aspect with absence of the light streak (Heine, Marx[7], Moore[8], Hardy[9], Wagener[10]). The color is variously described as light salmon (Heyl[3]), strawberry and cream (White[4]), milky (Heine[5]), or a silvery sheen (Gray and Root[6]). The nerve head is usually normal. The background of the fundus may be normal, or the choroidal circulation may present a paler aspect.

Through the kindness of Dr. A. C. Curtis, of the medical department of the University of Michigan, a study of the fundus changes through all stages in two cases was made possible.

Case 1. (No. 37 in the table): P.B., male, farmer, aged twenty years, presented himself at the clinic on January 7, 1928, with a complaint of weakness and thirst of a month's duration. Two weeks before a physician had found sugar in his urine. Three or four days later he had become unconscious. He was treated with insulin and placed on a diet consisting of P 55 gm., F 220 gm., carbohydrate 35 gm. He improved rapidly, and one week before admission the insulin had been discontinued. He had lost forty pounds in five weeks.

Physical examination revealed a young white male well developed but undernourished—in no distress. Examination of the head and neck were essentially negative. The chest was well developed. There was normal resonance throughout. Breath sounds were vesicular. No adventitious sounds were heard. The left border of cardiac dullness was 8 cm. from the midsternal

Table no. 1, case no. 37

Date	Urine		Blood		Eye findings	Diet						Remarks	Wt.
Month day and year	Glucose	$FeCl_2$	Sugar (fasting)	Lipids %		P	F	C	G	Cal.	Insulin		
Jan. 7, '28	—	—	100.			55	220	35	90	2200	0		
Jan. 10, '28	—	—			Normal fundi	60	280	65	126	3000	0		
Feb. 1, '28	—	—	88.			60	280	65	126	3000	0		
Oct. 28, '28	63.7	++				25	130	18	50	1200	0	Blood NPN 26.9	
Nov. 5, '28	7.66	++		11.600	Lipemia retinalis	25	130	18	50	1200	0	mg./100c.c. BMR 12%	
Nov. 8, '28	14.25	+			Lipemia retinalis decreased	20	90	14	30	900	0	Developed edema of face and extremities	129
Nov. 10 '28	4.00	trace			L. r. decreased	20	90	14	30	900	0	Edema has disappeared	
Nov. 13, '28	4.90	trace			L. r. still recognizable	55	220	35	90	2200	35		
Nov. 14, '28	—	—		2.256	Normal fundi	55	220	35	90	2200	35		
Nov. 21, '28	—	—			Normal fundi	55	220	35	90	2200	30		
Nov. 29, '28	—	—		1.449	Normal fundi	135	220	125	231	3000	42		
Dec. 16, '28	—	—		0.835	Normal fundi	135	280	240	340	4000	100		134
Jan. 11, '29	+	—										Acute otitis	
Jan. 17, '29	+	—	140.	0.700	Normal fundi	135	280	240	340	4000	152	media. Constant	
Jan. 18 '29	—	—			Normal fundi	135	280	240	340	4000	182	glycosuria. No	
Jan. 30, '29	—	—			Normal fundi	135	280	240	340	4000	194	acidosis	
Jan. 31, 29	+	—		—	Normal fundi	135	280	240	346	4000	80	Normal fundi. Blood lipids slightly decreased	
Feb. 7, '29	++	—	176.		Normal fundi	135	280	240	346	4000	80	Insulin decreased.	
Feb. 13, '29	+++	—		0.720	Normal fundi	135	280	240	346	4000	60	Glycosuria increased.	
Feb. 19, '29	++++	—			Normal fundi	135	280	240	346	4000	18	No acidosis. Normal	
Feb. 20, '29	++++	+	221		Normal fundi	135	280	240	346	4000	18	fundi	
Feb. 21, '29	++++	+			Normal fundi	135	280	240	346	4000	6		
Feb. 22, '29	++++	++			Normal fundi	135	280	240	346	4000	6	Insulin further re-	
Feb. 23, '29	++++	++			Normal fundi	135	280	240	346	4000	0	duced. Glycosuria in-	
Feb. 24, '29	++++	+++			Normal fundi	135	280	240	346	4000	0	creased. Acidosis and	
Feb. 25, '29	++++	+++			Perivascular increase	135	280	240	346	4000	0	lipemia appear.	
Feb. 26, '29	++++	++++		3.650	Lipemia retinalis	135	280	240	346	4000	0		
Feb. 27, '29	++	+			Lipemia retinalis	135	280	240	346	4000	110	Full insulin dosage re-	
Feb. 28, '29	++	+			Lipemia retinalis (advanced)	135	280	240	346	4000	105	instated. Glycosuria, acidosis, lipemia disappear.	
Mar. 1, '29	+	—			Lipemia retinalis (decreased)		280	240	346	4000	70		
Mar. 2, '29	+	+		1.023	Normal fundus	135	280	240	346	4000	90		
Mar. 3, '29	++	—			Normal fundus	135	280	240	346	4000	90		
Mar. 4, '29	—	—			Normal fundus	135	280	240	346	4000	90		
Mar. 5, '29	—	—			Normal fundus	135	280	240	346	4000	120		
Mar. 7, '29	—	—	0.912		Normal fundus	135	280	240	346	4000	120		
Mar. 10, '29	—	—			Normal fundus	60	280	65	126	3000	120		

line in the fifth interspace. The heart sounds were regular, of good quality, rate fifty-four per minute. Over the precordium there was a slow, blowing systolic murmur. No other murmurs were heard. Blood pressure 110/58. Abdomen was negative. Neurological examination was negative.

Laboratory examinations showed the urine to be free from sugar, acetone and albumin. Sediment showed a few hyalin casts; no red or white blood cells. The blood showed 80 percent hemoglobin, 4,540,000 red blood cells and 4,640 white blood cells per c. mm. The differential count was within normal limits. Fasting blood sugar was 100 mg. per 100 c. c.

Course in the hospital: The patient was placed on a high fat diet containing 2,200 calories. After a few days this was increased to a 3,000 caloric diet, because of his occupation. X-ray examination of his chest indicated some accentuation of the right bronchial tree. Special plates of the apices were negative. Electrocardiogram showed a sinus bradycardia. He continued sugar-free, at no time receiving insulin. He was instructed regarding his diet and discharged on February 1, 1928.

On October 26, 1928, the patient returned because of loss of weight, weakness, polyuria, polydipsia and polyphagia. He stated that he had not strictly adhered to his diet, but had avoided

sugar. Examination revealed a slight odor of acetone on the breath. He was found to have a considerable glycosuria and acetonuria.

Examination of the fundi on November 5, 1928, showed a marked lipemia retinalis. (Figure 1.)

Right eye: Media clear. The disc oval vertically. Physiological depression present, lamina cribrosa not seen. The disc grayish in color. The vessels engorged (not ribbon-like), much broader than normal, the diameter being increased by about one-half. Arterial reflex stripe increased. In the neighborhood of the disc, the axis of the arteries a salmon-pink color, paling to a cream color near the walls. The veins of a lavender tint. This rapidly fades, and one disc diameter from the disc the arteries and veins are indistinguishable, both becoming ivory white. The retina is transparent. Choroidal circulation shows quite plainly (not well shown on the diagram). Choroidal vessels have a faint grayish haze, not marked. Macula is well made out; foveal reflex is present.

Left eye: Fundus is essentially the same as in the right eye.

The blood taken on this day showed 11.6 percent total lipids. The glycosuria cleared up somewhat slowly on a diet containing 50 gm. glucose. It was reduced to one containing 30 gm. glucose. After five days on this diet, he still showed 4.90 gm. glucose output in a day and a trace of acetone. The lipemia retinalis was still recognizable though diminished. Nine days after the lipemia retinalis was discovered, he was given insulin for the first time. The appearance of the fundus was noted each day. The vessels gradually became smaller, and the larger vessels showed a more normal color. The central part of the vessels returned to normal first. On November 20, 1928, only a few fine vessels were cream-colored, and there remained only an occasional grayish streak along the walls of the larger arteries and veins. On November 21, 1928, the fundi presented a normal appearance aside from a possible slight increase in the perivascular sheaths. Along the course of the superior temporal vein in the right eye were several glistening dots. Two lay directly on the wall of the vein, one was at the end of a venule. Two were apparently not associated with vessels and had the appearance of hyaline dots. In the left eye there were several conglomerate hyaline dots beyond the macula.

The total blood lipids on this day were 2.26 percent. Daily fundus examinations were made during the following week, and no changes were noted. The patient continued sugar-free and acetone-free on the same diet with insulin. On November 29, 1928, the blood lipids were 1.45 percent. On December 16, 1928, they were 0.835 percent.

The blood lipids had fallen from 11.6 to 0.835 percent on a high caloric, high fat diet. Wishing to secure the effect of a further increase in the fat and caloric intake, the diet was raised to P 135, F 280, C 240, with an available glucose of 346 gm. and 4,020 calories per day. The glucose was adequately covered with insulin, so that the patient remained aglycosuric and acetone free from December 16 to January 11. The fundi showed no change on daily examination.

On January 11, 1929, he developed an otitis media and was admitted to the hospital. From January 11, 1929, to January 17, 1929, he showed a mild glycosuria, without acidosis. The fundi remained normal through this interval. On January 17 the blood fat was 0.72 percent. On January 21, the otitis media had subsided and it was possible to decrease the insulin dosage.

In order to observe further the effect of a glycosuria without acidosis on the blood lipids of this patient, the insulin was gradually decreased so that on January 31, 1929, he developed a glycosuria. His glycosuria was maintained at a fairly constant level without acidosis until February 19, 1929, when the insulin was further reduced, in an attempt to reproduce the lipemia retinalis. On February 20, 1929, the ferric chloride reaction of his urine was positive. No change was observed in his fundus

until the fifth day of his acidosis, when there appeared an increase in the perivascular sheaths, with a distinct grayish reflex on each side of the vessels. The next day this was very much more marked. The vessels showed almost normal color and reflex stripe, except for a narrow gray band edging each one. This made the vessels appear half again as broad as on the previous day. Small vessels could be seen which had been invisible the day before. As the vessels became smaller they became more whitish. Their arterioles and venules approached a common color, but were still distinguishable. There was a distinct lipemia retinalis. The blood lipids on this day were 3.650 percent.

On the succeeding day the picture was more advanced. Smaller vessels were cream colored and indistinguishable. The patient's full insulin dosage was reinstituted on February 27th, immediately upon the satisfactory reproduction of the picture. There was, however, little change in the fundus the following day. On March 1, 1929, the vessels were considerably diminished in size and nearly normal in color. The blood lipids had fallen to 1.023 percent. Doubtless this return to normal was too rapid to use this figure in the estimation of the point at which lipemia retinalis disappeared. On March 2nd there was no evidence of the recent change except for an occasional narrow grayish band along the wall of a large vessel. On March 3rd the fundi were entirely normal, except for the hyaline dots previously mentioned. No change was noted during the following week. On March 7th, the total blood fat was 0.912 percent. On March 10 the diet was reduced to a 3,000 caloric high fat diet. The fundus was normal at the time of his discharge on March 15, 1929.

Case summary: A young farmer with mild diabetes, which had been controlled with a high fat diet ten months before, returned to the clinic in acidosis on account of dietary indiscretions. His fundi revealed a lipemia retinalis. The total blood fat was 11.6 percent. His fundi became normal in sixteen days on a high fat diet with insulin. His blood showed 2.26 percent fat at this time but fell gradually to 0.835 percent.

The next step in the study of these cases is an attempt to establish the importance of acidosis as the essential factor in the causation of lipemia retinalis, as the cases heretofore reported show an almost constant relation to glycosuria and acidosis.

The patient was placed on a high fat, high caloric diet (containing 4,000 calories per day) for twenty-six days without demonstrable change in the fundus, thus controverting the theory, variously supported, that lipemia retinalis is produced by fat in the diet.

For twenty-seven days he was allowed to show a gradually increasing glycosuria, without acidosis. The blood fats did not rise during this experiment. His fundi remained normal.

He was finally allowed to develop an increasing acidosis, on the fifth day of which he showed a lipemia retinalis when the blood fat was 3.65 percent. This disappeared rapidly when his insulin was reinstated.

Case 2 (no. 38 in the table): E. K., male, aged seventeen years, a high school student, developed polydipsia, polyphagia, and precordial pain in 1926. Physical examination was essentially negative. Urinalysis showed a one-plus albumin, four-plus sugar, 8 to 10 white blood cells per low power field, a few red blood cells, but no casts. Fasting blood sugar was 136 mg. per 100 c. c. His diabetes was controlled without insulin and he was discharged on a weighed diet consisting of proteins 55, fats 210, carbohydrates 175, total glucose 210 gm. He returned four times for readjustment of his diet. His second admission was in July, 1927, when he was discharged on a diet containing 160 gm. of available glucose. Third admission was in October, 1927, when he was discharged on a high fat diet containing 3,000 calories with twenty units of insulin. The insulin was gradually increased in 1928 to forty-seven units.

Until November, 1928, the patient adhered closely to his diet and was sugar-free. At that time a faith healer

Table no. 2, case no. 38

Date	Urine		Blood	Eye findings	Diet						Remarks
Month and day	Total Glucose	$FeCl_3$	Lipids %		P	F	C	G	Cal.	Insulin	
Jan. 29	41.9	++++	4.280	Lipemia retinalis	60	280	65	126	3000	15	Glycosuria, acidosis, severe lipemia.
Jan. 30	5.2	+++		Lipemia retinalis	60	280	65	126	3000	29	
Jan. 31	23.0	++		Lipemia retinalis	98	280	150	234	3500	70	
Feb. 1	35.0	++		Lipemia retinalis decreased	98	280	150	234	3500	90	Glycosuria and acidosis disappeared
Feb. 2	24.0	+		Lipemia retinalis more	98	280	150	234	3500	90	
Feb. 3	27.0	—		Only very fine	98	280	150	234	3500	105	
Feb. 4	29.0	trace		vessels show	98	280	150	234	3500	115	
Feb. 5	19.0	—		whitish color	98	280	150	234	3500	125	
Feb. 6	2.0	—		Only very fine vessels show whitish color	98	280	150	234	3500	120	
Feb. 7	trace	—	2.830	Normal fundus	98	280	150	234	3500	125	
Feb. 8	trace	—		Normal fundus	98	280	150	234	3500	115	
Feb. 9	+	—		Normal fundus	98	280	150	234	3500	110	
Feb. 10	2.0	—	2.830	Normal fundus	98	280	150	234	3500	110	Glycosuria and acidosis disappeared
Feb. 11	2.0	—		Normal fundus	98	280	150	234	3500	115	
Feb. 13	—	—	1.112	Normal fundus	98	280	150	234	3500	115	
Feb. 15	—	—		Normal fundus	98	280	150	234	3500	60	
Feb. 16	trace	—		Normal fundus	98	280	150	234	3500	40	Insulin decreased
Feb. 17	0.5	—		Normal fundus	98	280	150	234	3500	25	Glycosuria increased
Feb. 18	5.0	—		Normal fundus	98	280	150	234	3500	20	No acidosis
Feb. 19	32.0	—		Normal fundus	98	280	150	234	3500	10	Lipemia decreased slightly
Feb. 20	41.7	—		Normal fundus	98	280	150	234	3500	10	
Feb. 21	51.0	+	0.900	Normal fundus	98	280	150	234	3500	0	Superior temporal vein shows grayish streak beyond macula
Feb. 22	60.0	++		Normal fundus	98	280	150	234	3500	0	
Feb. 23	62.5	+++		Normal fundus	98	280	150	234	3500	0	
Feb. 24	102.6	+++	0.900	Normal fundus	98	280	150	234	3500	0	Insulin discontinued, Glycosuria, acidosis increased. Lipemia increased but not sufficiently to be seen in fundus
Feb. 25	85.0	+++		Normal fundus	98	280	150	234	3500	0	
Feb. 26	33.5	+++	1.370	Normal fundus	98	280	150	234	3500	0	
Feb. 27	5.0	+		Normal fundus	98	280	150	234	3500	110	
Feb. 28	—	++		Normal fundus	98	280	150	234	3500	110	Streak has disappeared
Mar. 1	1.0	trace		Normal fundus	98	280	150	234	3500	115	Glycosuria and acidosis again controlled.
Mar. 2	trace	+		Normal fundus	98	280	150	234	3500	115	
Mar. 3	—	—		Normal fundus	98	280	150	234	3500	115	Lipemia slightly decreased.
Mar. 4	—	—		Normal fundus	60	280	65	126	3000	50	
Mar. 5	—	—	1.120	Normal fundus	60	280	65	126	3000	50	Discharged.

persuaded him to break his diet and stop insulin. He felt well in spite of a considerable indulgence in pastries and confections until December, 1928, when his polydipsia and precordial pain returned. For the past two weeks he had felt weak and drowsy. He was readmitted on January 29, 1929.

Physical examination was essentially negative: Temperature 98°; Pulse 80; blood pressure 130/90; weight 112¾ pounds. Urinalysis showed glycosuria and acetonuria.

Fundus examination: O.D. Media clear. Physiological depression present, lamina cribrosa faintly seen, rings distinct. Directly above the disc about four disc diameters is a small yellowish spot in the retina. Veins faint purplish hue, arteries a pale pink. Light grayish streaks are seen along some of the larger veins. As the vessels become smaller, the color fades to a creamy white, so that it is difficult to distinguish between the arteries and veins. Large veins are quite purple in the center and almost white at the periphery. Macula is distinct, foveal reflex present.

O.S. Media clear. Physiological depression present, lamina cribrosa faintly seen; rings distinct. Arteries and veins have the same appearance as in O. D. Foveal reflex present.

Diagnosis: lipemia retinalis.

The blood lipids on this day were 4.28 percent. The patient's course in

the hospital is summarized in table 2. He was placed on a high fat, high caloric diet with insulin. Daily independent ophthalmoscopic examinations were made. In four days, there were only occasional grayish streaks along the larger vessels, apparently in the vessel walls or the perivascular sheaths. The caliber of the vessels seemed to be unaltered by these streaks. The fine vessels still showed a whitish color throughout. In nine days, the fundi had returned to an entirely normal appearance. On this day the total blood lipids were 2.83 percent. Subsequent comparison with the diabetic records showed this to be coincident with the disappearance of acidosis and a greater reduction in the glycosuria.

The fundus continued to present a normal appearance. One week later, the total blood lipids were 1.112 percent. In an effort to reproduce the lipemia retinalis, the insulin was cut from 115 to 60 units per day and this was gradually reduced to zero. For the next week the patient showed an increasing glycosuria, but no evidence of acidosis. At the end of this week, the blood lipids had fallen somewhat further to 0.90 percent in spite of the glycosuria. He was continued on the same diet, containing 3,500 calories, without insulin.

During the next week, his glycosuria became more severe and an increasing acidosis developed. On February 25th at the end of the week, his blood lipids were 1.37 percent but there was no change in the fundi, except that a grayish streak appeared along the course of the superior temporal vein in the right eye beyond the macula. Slight symptoms developed from his acidosis on this day. The experiment was, therefore, discontinued without an actual return of the lipemia retinalis. Insulin was reinstated. His glycosuria and acetonuria disappeared in four days and he was discharged to the out-patient service on a 3,000-caloric diet with insulin.

Case summary: A high school student had been under treatment for diabetes for two years when he stopped his diet. Two weeks later he returned to the hospital with marked glycosuria and acidosis. His fundi showed lipemia retinalis. Analysis of his blood revealed 4.28 percent fat. He was placed on a high fat, high caloric diet with insulin. His fundi returned to normal in nine days coincident with a fall in total blood lipids to 2.83 percent, and a disappearance of the acetonuria. One week later, after his glycosuria was controlled, his insulin was decreased. The glycosuria reappeared but his blood lipids decreased slightly. During the following week, he showed an increasing acidosis, and at the end of the week his blood lipids had risen, though not sufficiently to produce changes in the fundus. The experiment was discontinued at this time on account of symptoms. He was controlled with insulin and discharged.

Comparative study of cases from the literature:

The data from the thirty-seven reported cases have been summarized in table 3. Analysis of the table reveals several important facts.

Sex: Thirty, or 86 percent, of thirty-five cases in which sex was noted were males; five were females. Thirty-five cases are, of course, too small a series to draw conclusions regarding the incidence in the sexes. However, the high preponderance of males in the series suggests that males may be somewhat more susceptible. If this is true, it is presumably because of the higher energy requirements of this sex.

Age: The range in the thirty-five cases in which age was recorded is from nine (Wagener's case no. 23) to fifty (Gray and Root's case no. 26). The average age is twenty-five years. The almost uniform youth of these patients is remarkable in the face of the fact that the majority of diabetics are past forty. In spite of the evident severity of their diabetes, only one in the series showed retinal hemorrhage (Cohen's[20] case no. 20). Evidently lipemia retinalis occurs typically in young diabetics and the hemorrhagic neuroretinitis is largely confined to older diabetics. The explanation of this lies in the fact that the

ability to oxidize fats completely is a function which increases with age. Ferber and Apperman say: "The old diabetic is usually a mild case holding his own over years despite dietary indiscretions, with excretion at times of large quantities of sugar in urine containing little or no ketone bodies, because he can fall back on his fat metabolism".

Level of blood lipids: The highest recorded level of blood lipids when lipemia retinalis was recognized was reported by Chase[11], case no. 34. The blood in this case showed 48 percent lipids by the Babcock method of estimation. Köllner's[12] case no. 12 showed 26.25 percent blood fat. Reis's[13] case no. 4 and Ferber and Apperman's[14] case no 35 each showed eighteen percent blood fat.

The great disparity in the percentage of blood lipids in the reported cases is undoubtedly partially due to differences in the methods used in these determinations. Even the colorimetric methods, such as Bloor's, employed by most of the recent observers, occasionally err grossly through the presence of complicating pigments. The method employed by H. C. Eckstein in these reported cases has been described by him elsewhere. Suffice it to say that it is a gravimetric procedure and that the normal percentage of total blood lipids is 0.4 to 0.5 percent. Probably the indications are that some of the higher values of the blood lipids are open to question, and, therefore, it is not possible to estimate the degree of lipemia which is compatible with life or recovery. However, the ophthalmoscopic aspect of many of the reported cases was much more marked than that seen in case no. 37, illustrated in figure 1, from which it appears that lipemia may be considerably higher than eleven percent without peril to the patient.

The lowest levels at which lipemia retinalis was diagnosed were reported by Wagener (case no. 24) at 3.5 percent, Heine (case no. 9) at 4.0 percent, and Hardy[9] (case no. 30) at 4.5 percent. Wagener's case no. 22 still showed evidence of the lipemia in the fundus when the blood lipids were 4.08 percent. The fundus had not returned to normal in Muskat's case no. 31 when the blood lipids were 3.15 percent.

These observations correspond well with the cases now reported. As acidosis was gradually reinduced in the first case, the blood fat rose. On the day when a definite diagnosis of lipemia retinalis could be made, the total blood fat was 3.65 percent. Apparently, therefore, lipemia can be recognized ophthalmoscopically when the blood fat rises above 3.5 percent. The following observations have been made on the percentage of fat in the blood when the fundus has returned to normal:

Author	Number	Percent
Hardy	case 21	2.9
Wagener	case 22	1.97
McGuire[15]	case 25	3.70
Gray and Root	case 27	2.95
McCann[16]	case 28	10.8
Hardy	case 30	2.3
	case 37	2.26
	case 38	2.83

The blood lipids have been estimated in eight cases at the time when the fundus was first observed to have regained its normal appearance. No explanation for the apparent rise in the blood fat in McCann's case no. 28 suggests itself. The others range from 1.97 percent to 3.70 percent, and average 2.70 percent blood lipids. It may be assumed that the fundus has returned to a normal aspect when the lipemia falls to two percent.

Etiology: Numerous authors have followed Hale White in stating that lipemia retinalis occurs in order in the following conditions: diabetes, alcoholism, phosphorus poisoning, pneumonia, peritonitis, and gout. Table 3 provides an interesting commentary on this statement. Every case in the literature except one had diabetes and probably was in acidosis.

The one exception, case no. 23, of Wagener, was in a boy of nine years with lymphatic leukemia. In this case radium had been applied to enlarged glands in the mediastinal, cervical, supraclavicular, infraclavicular, axil-

Table no. 3

COMPARATIVE STUDY OF CASES FROM THE LITERATURE

Case	Reported	Date	Sex	Age	Total blood lipids	Outcome	Diabetes	Acidosis	Remarks
No.		Year	M or F	Yrs.	%		+ or −	+ or −	
1	Heyl	1880	M	20	−	Died	+	+	Microscopic blood fat.
2	White	1902	M	26		Recovery	+	+	Living 3 months.
3	Fraser	1903	M	17	23.3 10.3	Died (coma)	+	+	Postmortem determination of blood fat
4	Reis	1903	M	28	18.1	Died (coma)	+	+	Some lenticular opacities
5	Turney Dudgeon	1906	F	35	−	Died (coma)	+	+	Pneumonia also developed.
6	Krause	1906	—	17	8.65	Died (coma)	+	+	
7	Krause	1906	—	33	6.85	Died (coma)	+	+	
8	Heine	1906	M	17	8.65	Died (coma)	+	+	
9	Heine	1906	M	—	4.0	Died (coma)	+	+	Previously normal fundus
10	Marx	1907	M	—	7.5	Died	+	+	Pneumonia, tuberculosis
11	Hertel	1909	—	Young	—	Died (coma)	+	?	
12	Köllner	1910	M	25	26.2	Improved Died	+	+	Fundus improved at 13.5%, normal later
13	Stoerk	1911	M	10	—	Died	+	+	
14	Darling	1912	M	48	Large amount	Died	+	+	Vision blurred, gross fat in blood
15	Ulbrich	1912	M	29	—	—	+	+	
16	Moore	1915	M	23	—	Died (coma)	+	+	
17	Moore	1915	F	25	—	Died (coma)	+	+	
18	Moore	1920	M	25	—	Died (coma)	+	+	
19	Williamson	1921	M	22	—		+	?	Patient too ill for complete examination.
20	Cohen	1921	M	14	8.95	Died (coma)	+	+	Two small hemorrhages, hypotonia bulbi

Table no. 3, continued.

Case No.	Reported	Date Year	Sex M or F	Age Yrs.	Total blood lipids %	Outcome	Diabetes + or −	Acidosis + or −	Remarks
21	Hardy	1921	M	29	9.50	Died (coma)	+	+	Fundus normal at 2.9% in 2 weeks. Xanthoma
22	Wagener	1922	M	26	8.20	Recovery	+	+	Lipemia decreased to 4.08% in two days (insulin); faintly visible in fundus.
23	Wagener	1922	M	9	5.0	?	− Lymphatic leukemia	−	Normal fundus following transfusion
24	Wagener	1922	F	10	3.5	Recovery	+	+	Normal fundus 1 week, living 2 months.
25	McGuire	1922	M	33	8.60	Recovery	+	+	Normal fundus in 2 months.
26	Gray Root	1923	F	50	4.24	Died (coma)	+	+	Normal fundus in 1 week.
27	Gray Root	1923	M	36	6.30	Recovery	+	+	Normal fundus in 4 days.
28	McCann	1923	M	15	9.5	Recovery	+	+	Lipemia retinalis disappeared in 1 week as blood fat rose.
29	Rowe	1924	F	15	15.0	Recovery	+	+	Insulin.
30	Hardy	1924	M	23	4.5	Recovery	+	+	Insulin, xanthoma
31	Muskat	1924	M	33	6.04	Recovery	+	+	Practically normal fundus at 3.15 %.
32	Machlis	1924	M	24	—	Recovery	+	+	Rapid disappearance of lipemia retinalis. Xanthoma disappeared in 1 month.
33	Bantin	1926	M	23	—	Recovery	+	+	Globules of fat seen in veins. Pneumonia and nephritis complicated recovery.
34	Chase	1927	M	34	48.0	Recovery	+	+	Babcock method of fat estimation.
35	Ferber Apperman	1927	M	38	18.5	Recovery	+	+	Normal fundus at 0.48 %. Xanthoma

Table no. 3, continued.

Case	Reported	Date	Sex	Age	Total blood lipids	Outcome	Diabetes	Acidosis	Remarks
No.		Year	M or F	Yrs.	%		+ or −	+ or −	
36	Shannon Mohler	1929	M	42	—	Recovery	+	+	Normal fundus in 5 days.
37	Parker Culler	1930	M	20	11.6	Recovery	+	+	Normal fundus in 16 days at 2.26 % blood fat.
38	Parker Culler	1930	M	17	4.28	Recovery	+	+	Normal fundus in 7 days at 2.83 % blood fat.

lary, and inguinal regions, seventeen days and ten days previous to the fundus examination. Oppenheimer and Fishberg[30] have clearly shown by post-mortem findings that the reticulo-endothelial apparatus is capable of storing large amounts of fat. Extensive destruction of these tissues, normal or pathological, might well be expected to throw large amounts of lipids into the blood. The picture was at any rate evanescent, disappearing rapidly following transfusion, a form of palliative therapy. We agree with Wagener in his suggestion that the picture in this case might have been materially affected by radium therapy.

Associated diagnoses: Of the thirty-seven diabetics, all except two showed evidence of acidosis. In Table 3 we have recorded as being in acidosis those patients who showed a diminished CO_2 combining power or a positive reaction to ferric chloride in the urine, and, failing these data, those who presented clinical symptoms of acidosis, as acetone breath, drowsiness or coma, at the time when the lipemia retinalis was recognized. In some of the cases, as Turney and Dodgeon's[13] case no. 5, Gray and Root's case no. 26, and Ferber and Apperman's case no. 35, the acidosis cleared up rapidly under treatment. The two cases not so reported were probably also in acidosis. Hertel's[18] case no. 11 died in coma shortly, and Williamson's[19] case no. 19 was a diabetic too ill to return for a complete examination.

As is shown in Tables 1 and 2, the blood fat decreased in patients that had shown lipemia retinalis, in spite of continued high fat, high caloric diet, and a continued glycosuria without acidosis, but it increased when acidosis was also reinduced.

Though further investigation may prove these facts to be coincident, the data accumulated to date warrant the suggestion that acidosis may be prerequisite in the production of a lipemia retinalis. The treatment of diabetes has become so sure that glycosuria, lipemia, and especially acidosis become evanescent. Acidosis that may have caused a lipemia may disappear in a few hours after insulin is started. We have seen this occur in one patient (not reported in this paper). Treatment may confuse the data and has led at least one observer to deny the significance of acidosis in this respect.

Foster Moore[8] has seen a number of cases of lipemia in trench nephritis. None had a sufficient degree to be seen in the fundus. Wile, Curtis, and Eckstein[2] have found lipemia of low grade associated with xanthoma. It is undoubtedly true that an increase in blood lipids is found in a wide range of conditions. However, probably no disease other than diabetes, uncomplicated by treatment, gives rise to a lipemia so severe that it becomes visible in the fundus.

Prognosis: By reference to table 4 it will be noted that of the eighteen reported cases of lipemia retinalis in

which insulin was not administered only one recovered, while of the fifteen cases treated by insulin only one died, although the results were not stated in three cases. This small group of cases affords a graphic illustration of the change in the prognosis of severe diabetes which has been wrought by the use of insulin.

Lipemia retinalis does not develop in diabetes unless the process is very severe. These patients now do well unless their diabetic régime is broken by dietary indiscretion or by intercurrent infection, but they are of the group of diabetics who must adhere closely to their diet. Many of the cases in the literature were diabetics perfectly controlled until they broke their diets, when severe and often fatal complications followed. Hardy[9] says: "Lipemia in itself is not always of grave significance, but the combination of circumstance and phenomena which eventuate in the picture of lipemia retinalis mark the case as one of bad prognosis". Apparently the prognosis is not modified by the presence of lipemia. These patients have exactly the same expectancy as other severe diabetics. With proper caution they may now expect to lead long and active lives.

The ophthalmoscopic aspect: The discussion of lipemia retinalis in the German literature is devoted largely to explanation of the red background upon which the pale retinal vessels are superimposed. While the retinal vessels have an ivory white appearance in a majority of the well-developed cases reported, the choroidal circulation shows comparatively little change in its ophthalmoscopic aspect. On the other hand, some paling of the general fundus is described in severe cases. This is well illustrated in Hale White's case. Our own cases did not show much choroidal change.

As lipemia increases, no change is visible ophthalmoscopically until the blood fat reaches a line of about three percent. The fine arteries and veins are indistinguishable at four percent and the larger retinal vessels at ten percent. Perhaps a higher percentage of fat would produce a change in the color of the large choroidal vessels. The cases reported by Chase had probably the highest grade lipemia reported in the literature. This oxidated blood showed, on standing, a layer of creamy plasma nearly twice as thick as the layer of blood cells. The Babcock technique gave forty-eight percent of blood fat. While this amount may be too high, due to the inaccuracy of the method of determination employed, nevertheless, in his description of the fundus Chase says: "All vessels appeared as thick, ivory-colored tubes on light ivory-colored background of choroidal vessels". May it not be possible, therefore, that the appearance of the fundus in the various cases reported depends solely upon the amount of fat present in the blood?

In our case (no. 37) the earliest visible sign of the return of lipemia retinalis was the engorgement of all the vessels. Vessels became visible that could not be seen the previous day, and these vessels were pale. Soon there extended along the vessels, even the principal arteries and veins, a grayish white line. The vessels were one-and-a-half times the size of the day before. The light reflex was not much changed at this time. We are unable to say that this was not an infiltration of lipids into the perivascular lymph sheaths, though the color of the plasma may show near the walls of the vessels first because we are looking through a thinner layer of hemoglobin there.

The engorgement of the vessels may be attributed to a slowing of circulation in the smaller vessels. McCann[16] examined the capillary bed at the base of the nails by the Lombard technique and found the stream very slow in the capillaries. It was interrupted by white spaces the size of a leukocyte 23 to 24 per minute in each capillary loop.

Summary

Two cases of lipemia retinalis are reported, one with 11.6 percent, the other with 4.28 percent blood lipids. From our study of these two cases and the thirty-six other cases in the litera-

ture, we wish to suggest the following postulates:

1. Apparently, no disease except diabetes uncomplicated by treatment produces a lipemia of sufficient degree to be recognized ophthalmoscopically.
2. Diabetics probably do not show lipemia retinalis unless they are in acidosis.
3. Lipemia retinalis is confined largely to younger diabetics because they have a less efficient fat metabolism than older people.
4. Roughly, lipemia retinalis occurs when blood fats rise above 3.5 percent and disappears when blood fats fall below 2.5 percent.
5. Lipemia retinalis does not alter the prognosis of the diabetic in which it occurs.

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ADENOCARCINOMA OF THE LACRIMAL GLAND

So-called mixed tumor

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Five cases operated upon are described to illustrate the fact that the lacrimal gland may be the seat of a neoplasm such as is usually designated as a mixed tumor when it is encountered in either of several other locations. These tumors of the lacrimal gland have a low average of malignancy. Their multicellular arrangement has given rise to much dispute as to whether their origin is in epithelium or in connective tissue, and also as to the possibility that they demonstrate transformation from one type of cell to another.

Adenocarcinomas, so-called mixed tumors, that occur in the orbit are usually situated in its superior temporal region. They are often referred to as tumors of the lacrimal gland, and presumably they arise from cells of the lacrimal gland. The principal lobes of the gland are not often involved in the growth. The accessory lacrimal glands (glands of Krause), which extend along the fascia of the orbit from the lacrimal gland toward the nasal side, probably give rise to epithelial tumors that are characterized by glandular structure and which may be classified as tumors of the lacrimal gland. There are other glands of the orbit and lids which arise from epiblastic tissue, and from these may grow tumors with more or less differentiation toward gland cells. The tumors may also contain myxomatous tissue, cartilage, and sarcoma-like elements identical in structure with tumors of the parotid gland. The latter have been designated as mixed tumors.

That these mixed tumors are rare has been shown by Laura Lane, who in 1922 stated that only 229 cases had been reported in 323 years; and by Verhoeff, who said that only four had been found in a series of 200,000 patients with ophthalmic disease at the Massachusetts Eye and Ear Infirmary.

Although Verhoeff considers that these tumors arise from the anlage of the lacrimal gland, and regards them as congenital epithelial tumors, they are usually found in adults. The first sign to appear is exophthalmos. The growth of the tumor is slow, the exophthalmos gradually increasing for from one to five years. The tumor is often single and encapsulated, but multilobular tumors also occur primarily. Some parts of these tumors are encapsulated; other parts are infiltrating and show characteristic evidences of malignancy. If they are incompletely removed, they are prone to occur with increasing characteristics of malignancy and with increasing rapidity of growth. Many fatal cases have been reported.

These so-called mixed tumors are without clinical characteristics and cannot be diagnosed with certainty before removal, although the inference that such a tumor exists may be made from the situation of the lesion, the time of life at which it appears, and the development of clinical signs. Holloway made the diagnosis of "probable mixed tumor of the lacrimal gland" in a man aged thirty-five years who had first noticed fullness in the upper and outer portion of the left orbit seven years previously.

Five patients with mixed tumors of the orbit have been operated on at the Mayo Clinic within the last three years. In one case the tumor was found to be nonencapsulated; in the other four cases the tumors were encapsulated. One patient had been operated on elsewhere and came to the clinic because of recurrence.

Case reports

Case 1: A married woman came to the clinic in the summer of 1926 because

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of pain in the right side of the head and swelling of the lids. For seven months previous to her visit to the clinic, intermittent pain in the orbit had appeared once or twice a day. There had been no protrusion of the eye until the last two weeks. Diplopia had been present only on looking to the extreme right. The general history and examination gave no pertinent information.

The exophthalmometer reading was as follows: right eye 18 mm., left eye 14 mm. Vision was rated as follows: right eye, 6/7; left eye, 6/5-2. There was fullness of the right lid, particularly about the outer rim of the orbit, and right exophthalmos. A firm mass could be felt about the outer rim of the orbit, extending from about the juncture of the middle and outer third of the brow, around the outer canthus, to the median line of the orbital rim below. The globe was pushed toward the nose; the distance from the pupil to the median line of the nose on the right side was 2.5 cm.; on the left side, 3 cm. There was no vertical deviation of the eyes, and rotation was unimpaired except in the field of action of the right external rectus muscle. Intraocular tension was not above normal. The conjunctiva and cornea were clear; the iris was bluish-brown. The pupils were equal, and were normal in size, shape, and position. The reaction to light and accommodation was normal. Ophthalmoscopic examination gave negative results. The diagnosis was tumor of the orbit. (Figure 1.)

A vertical incision 3 cm. long was made 1 cm. to the temporal side of the external canthus, and the periorbita was elevated around the margin of the orbit. A firm, broad mass, from which the periorbita could not be separated, lay inside the lateral wall. The mass extended to the apex of the orbit, almost entirely covering the lateral wall of the orbit, and extending into the upper and lower lids. It also involved the external rectus muscle and the nearby tissues. The lateral wall of the orbit was reflected outward. The tumor was then removed, with orbital tissue, including the external rectus muscle. The pathologic diagnosis was adenocarcinoma.

Five weeks after operation treatments with radium were instituted. Four treatments over two areas, one anterior and one lateral to the orbit, were given.

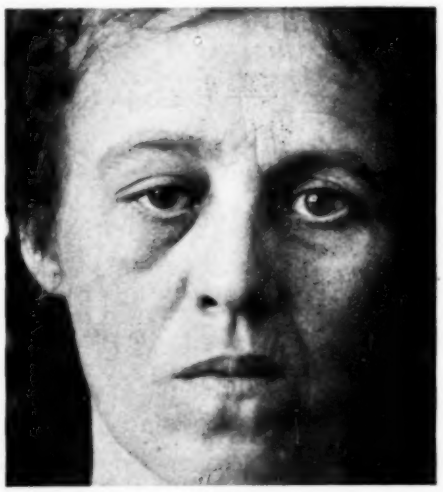

Fig. 1 (Benedict and Broders). Tumor of the orbit, with exophthalmos and lateral displacement of the globe. The tumor extended into the lower lid.

Convalescence was uneventful, although there was considerable chemosis and edema of the face and lids. A fistula formed, from which some pus drained. This was healed when the patient was dismissed two months after operation.

Five weeks after dismissal from the hospital the patient returned because of a small lump in the lower part of the right orbit. The scar of the original operation was depressed and adherent to the bone. The external orbital margin was palpable, and the resected wall of the orbit had apparently grown back into position; the eye was not movable; rather than protruding, it was possibly slightly retracted; it was directed almost straight forward. There were a few hard lumps around the globe which could be palpated through the lid; these were slightly movable. Glands could not be palpated either in front of the ear or along the side of the neck.

Radium was applied over the right orbit. A month later the patient returned. There was a depressed scar on the temporal side, with a small scab in the center. There was a nodular glandular mass over the skin of the lower lid, coming out from the temporal side of the orbit and extending over to the nasal side. Under the superior orbital notch, a small mass could be felt; the globe was in place but movements were limited. Exenteration of the right orbit was then advised. The tumor extended from the lower lid to the apex of the orbit, very little being in the upper portion. The orbital walls were intact and had not been penetrated by the tumor. The pathologic diagnosis was adenocarcinoma of the lacrimal gland. (Figure 2.)

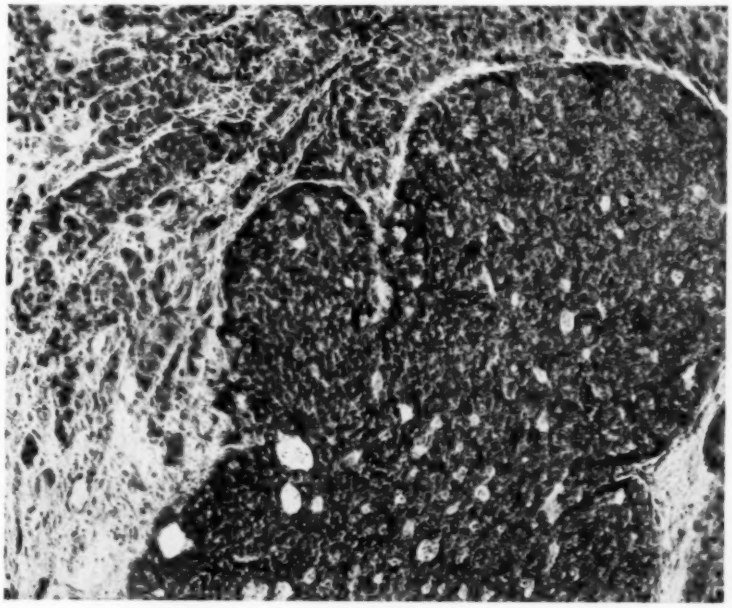

Fig. 2 (Benedict and Broders). Area of diffuse adenocarcinoma made up of round, oval, spindle, and stellate cells. The spindle and stellate epithelial cells have intermingled with the stellate mucous connective tissue cells.

Application of the radium was continued over three areas: one lateral to the right wall, one on the lateral wall, and one on the mesial wall. The patient was dismissed with the socket clean, in good condition, and with no evidence of recurrence, extension, or metastasis.

Two and a half months later the patient returned for more treatment with radium. The socket was in good condition. There has been no recurrence.

Case 2: A man aged thirty-six years came to the clinic because of protrusion of the right eye. About five years previously the right eye had become more prominent than the left. Slow but

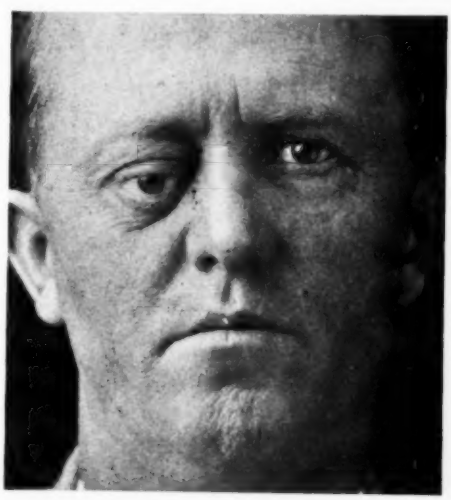

Fig. 3 (Benedict and Broders). Right exophthalmos, with vertical displacement of the globe. The tumor could be felt beneath the orbital rim.

steady progression had been noted in the exophthalmos, and there had been diplopia during a part of this time. There had been no pain or inflammation. (Figure 3.)

The exophthalmometer reading was as follows: right eye, 26 mm.; left eye, 15.5 mm. The vision of the right eye was rated 1/60; of the left eye, 6/5. There was limitation of movement of the right eye upward and temporally. Ophthalmoscopic examination of the right eye showed, on the temporal side of the disk, a thick sprinkling of nearly round deposits of pigment in the retina, situated between the superior and inferior temporal vessels. There was some mottling of the choroid but no gross change. The only vascular change noted was tortuosity of the vessels in the superior temporal quadrant.

Fig. 4 (Benedict and Broders). Single firm fibrous tumor, well encapsulated, removed from the orbit by the Krönlein operation.

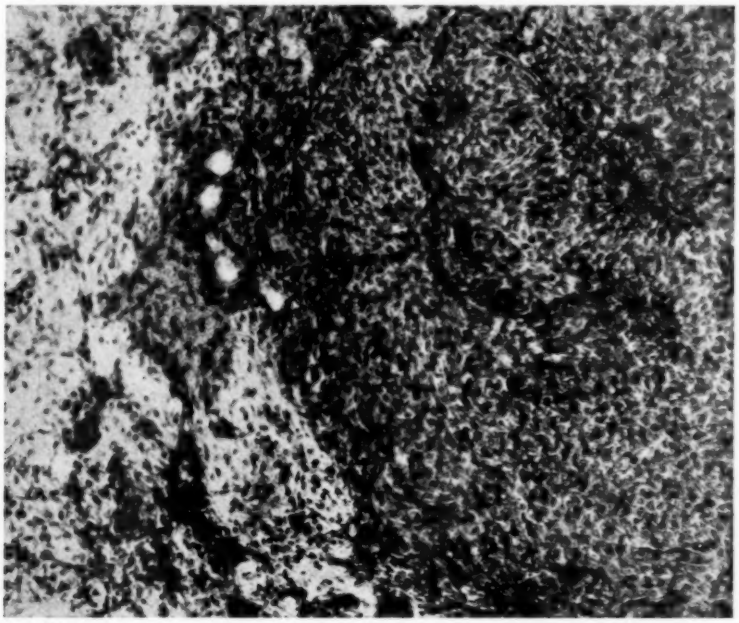

Fig. 5 (Benedict and Broders). Area of adenocarcinoma made up of spherical, oval, spindle, and stellate cells showing intermingling of spindle and stellate epithelial cells with stellate and spindle mucous connective tissue cells and stellate and spindle cartilage cells.

The tumor was found between the periorbita and the optic nerve, on the lateral side, lying beneath and behind the globe. It was firm, smooth, encapsulated, about 2.5 cm. in diameter and 1 cm. thick, roughly disk-shaped and not very vascular. The tumor was removed entirely by the Krönlein operation without injury to the optic nerve. There were no other tumors in the orbit. The pathologic diagnosis was adenocarcinoma.

When the patient was dismissed a week after the operation, vision of the right eye was 2/60; of the left eye, 6/5. The exophthalmometer reading was as follows: right eye, 17 mm.; left eye, 14 mm. There was movement of the eyeball in every direction, but elevation

was markedly weakened and there was some weakness of the external rectus muscle. (Figures 4 and 5.)

Case 3: A married woman aged thirty-nine years came to the clinic because of a recurrent tumor of the right orbit. The tissues of the right orbit had become swollen and red ten years previously. Three years later, the patient had noticed that the eye was more prominent than the left. Three years after that, a tumor, diagnosed as nonmalignant, had been removed from the right orbit elsewhere than at the clinic. Two years later still, a second operation had been performed, but only adhesions had been found. After this operation, a series of treatments by roentgen ray had been given. About a year and a half before her visit to the clinic, the conjunctiva had become swollen and had projected between the lids. The eye had not come forward, however, until seven months later, when swelling had appeared below the old incision and near the inner canthus of the upper lid.

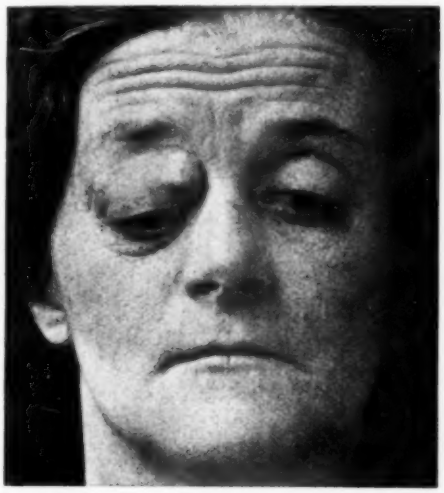

Fig. 6 (Benedict and Broders). Recurrent mixed tumor of the right orbit, with new tumor in the nasal part of the upper lid. The scar of the former operation is below the brow. The tumors and infiltrated tissue were completely removed through a brow incision.

On examination at the clinic, vision of the right eye was rated 6/12; of the left eye, 6/7. Exophthalmometer readings were as follows: right eye, 24 mm.; left eye, 15 mm. There were linear scars in the temporal half of the brow. (Figure 6.) Beneath these could be felt a flattened hard mass, which extended over the supraorbital margin,

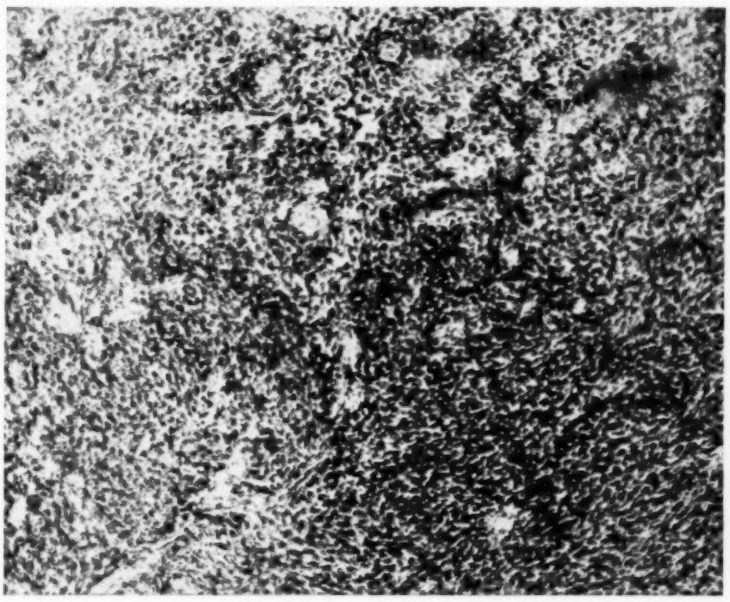

Fig. 7 (Benedict and Broders). Dense tissue made up of stellate epithelial cells, connective tissue, and cartilage cells.

down to the eyeball, and back into the orbit; it was about 1 cm. in width. Near the inner canthus there was a conical mass, 1 cm. in diameter, which pushed the upper eyelid forward but which was not adherent to it and was easily movable. Between these two masses, deep within the orbit, could be felt a mass which undoubtedly was pushing the eye downward and forward. A mass could not be felt on the infraorbital margin. The rotations of the globe were nearly normal. The visual fields were normal; the ophthalmoscopic examination was negative. A roentgenogram gave evidence of destruction of the bone on the upper lateral margin of the right orbit.

An incision was made just below the brow, the length of the lid. A nodule 1 cm. in diameter was taken from the nasal end of the upper lid, just beneath the skin. Connection between this tumor and the others in the orbit was not found. On the temporal side, in connection with and just behind the lacrimal gland, lay a flat, fairly firm, friable, nodular tumor which had eroded the lateral wall of the orbit into a cavity 1 cm. wide, 1 cm. deep, and 3 cm. long, leaving rough, overhanging edges of bone. A large amount of friable white tumor substance was taken from this cavity. The lateral and superior muscles of the globe were sacrificed. The lacrimal gland and nearly all of the periorbita on the temporal side were removed. The tumor was not near the optic nerve, which was normal in size from the globe to the apex. The pathologic diagnosis was adenocarcinoma. (Figure 7.)

Postoperative progress was slow. Treatment with radium was given to one lateral and one frontal field. Seven months after operation, the vision of the right eye was 6/12; of the left eye, 6/7. The patient could open the right lid about half way; rotations of the eye were good, except outward. Exophthalmometer readings were as follows: right eye, 23 mm.; left eye, 17 mm. There has been no recurrence of the tumor.

Case 4: A married woman aged twenty-five years had first noticed drooping of the left lid three years before she came to the clinic. A year later there had been proptosis of the eye, and this had gradually increased. About a year later diplopia had appeared but had been relieved by glasses. Vision had gradually decreased after that. For the last month there had been pain deep within the orbit, referred down the nose. Vision of the right eye was rated 6/5; of the left, 6/60. (Figure 8.)

Exophthalmometer readings were as follows: right eye, 16 mm.; left eye, 22 mm. There was proptosis of the left eye, with moderate ptosis. The eye was pushed downward and outward. There was no palpable destruction of bone about the margin of the orbit. A small mass was found beneath the supraorbital rim, extending from the supraorbital notch to the outer canthus. The conjunctiva was white and of good color. The cornea was clear; the anterior chamber was of normal depth; the iris was of good color; the pupil was oval and reacted normally to light and accommodation. Intraocular ten-

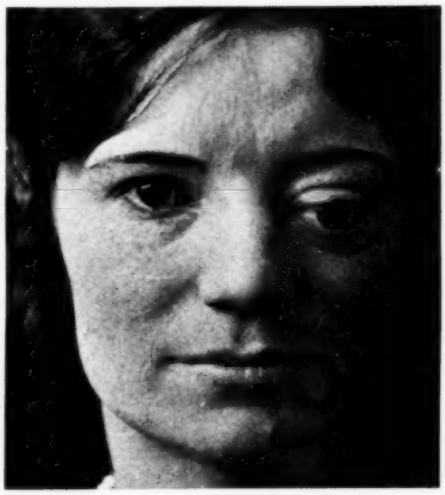

Fig. 8 (Benedict and Broders). Tumor of the left orbit, with lateral and vertical displacement and with exophthalmos. An encapsulated tumor 4 cm. long, 3 cm. wide, and 2 cm. thick, with few adhesions, was removed through a brow incision.

sion was not increased. The visual fields were normal. There was paralysis of the muscles which elevate the left eye, with some limitation of lateral movements. Evidence of extension or metastasis was not found. There was papilledema of less than one diopter.

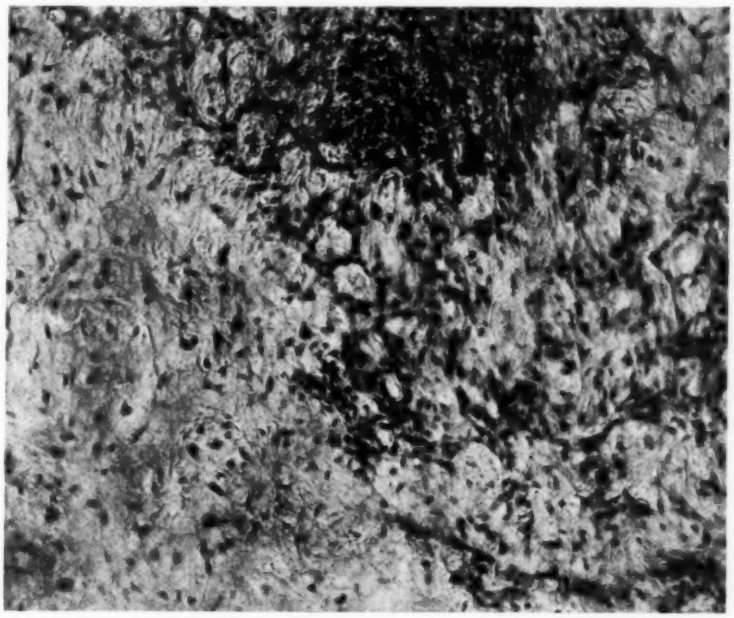

Fig. 9 (Benedict and Broders). Area of adenocarcinoma showing spherical, oval, and spindle cells.

Through a brow incision, the periosteum was elevated around the margin of the orbit and the superior periorbita was separated from the bone. The periorbita was opened, and a large tumor 4 cm. long, 3 cm. wide, and 2 cm. thick was found, filled with a thick, white, granular, friable substance with very little blood. The tumor was encapsulated, was easily separated, and was entirely removed without entering the orbital fat. The capsule was most adherent about the sphenoidal fissure, by a thin band of connective tissue. The wound closed without drainage. The pathologic diagnosis was adenocarcinoma. (Figure 9.)

Ten days after the operation, the extraocular movements were normal. Exophthalmometer readings were as follows: right eye, 14 mm.; left eye, 16 mm.

Case 5: A married woman aged thirty-three years had first noticed protrusion of the left eye five years previously. Some roentgenologic treatment had been given at that time, but none for the last two years. For two years, the exophthalmos had been con-

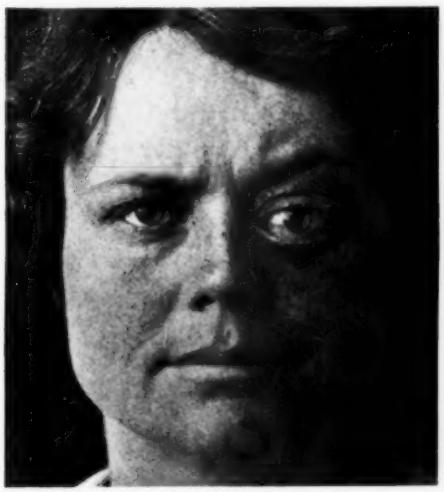

Fig. 10 (Benedict and Broders). Tumor of orbit of five years' duration, with exophthalmos, slight vertical deviation, and limitation of ocular motion.

stant. Recently, there had been some photophobia, redness, and increased lacrimation. Diplopia had never been present.

Vision of the right eye was rated 6/4 — 2; of the left eye, 6/30. Exophthalmometer readings were as follows: right eye, 15 mm.; left eye, 24 mm. The left eye was 8 mm. below the level of the right eye. Above the left eye and slightly lateral to it, a small firm mass could be palpated between the globe and the supraorbital margin in the region of the lacrimal gland. The condition of the globe was good and ophthalmoscopic examination gave negative results. (Figure 10.)

The tumor was removed through an incision about 3 cm. in length through the brow. The periorbita was separated and was entered in a radial direction about the middle of the superior wall. A large bilobed tumor about 1.5 by 3 cm. was removed. It was encapsulated and not firmly adherent. There was very little bleeding.

The pathologic diagnosis was adenocarcinoma, containing cartilage and some squamous epithelium.

Convalescence was smooth, and the patient was dismissed five days after operation. Vision in the right eye was

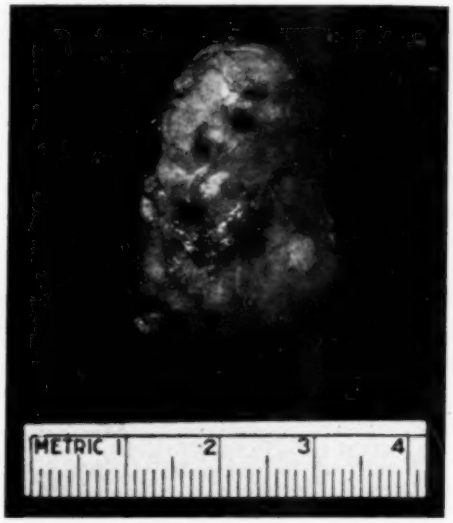

Fig. 11 (Benedict and Broders). Firm, encapsulated, bilobed tumor removed through a brow incision.

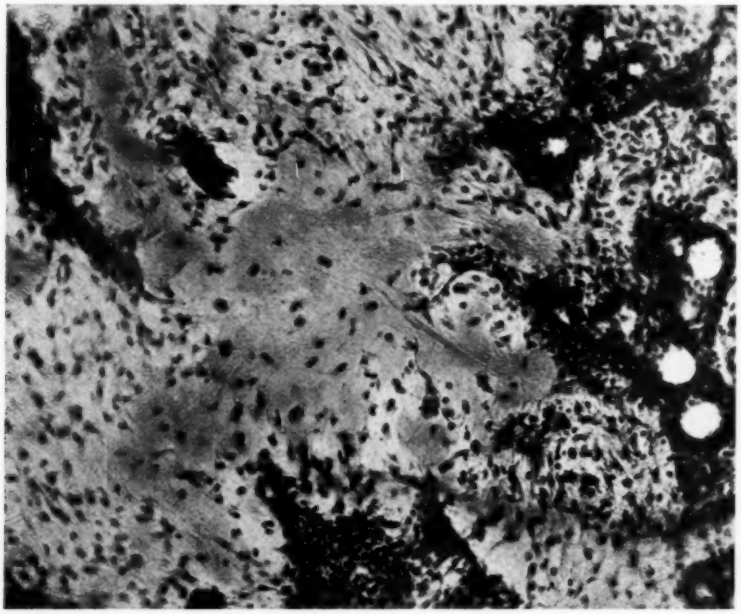

Fig. 12 (Benedict and Broders). Area of adenocarcinoma in which the cells on the left side of the picture are arranged in strands, and are large and more irregular than the alveolar group of cells on the right side. The cells as a whole, in this picture, bear a close resemblance to cells of the average adenocarcinoma of the breast.

rated at 6/4 — 2; in the left eye at 6/10 — 1. Exophthalmometer readings were as follows: right eye, 15 mm.; left eye, 17 mm. Extraocular movements were normal. (Figures 11 and 12.)

Comment

In a number of instances it has been demonstrated that there may develop in the lacrimal gland a neoplasm presenting macroscopic and microscopic structure identical with that of a neoplasm which, when encountered in such situations as the salivary glands, lips, palate, base of tongue, and cheeks, is usually designated as a mixed tumor.

Ewing, in his work on neoplastic diseases, presented in a concise manner the results of the studies of various investigators relative to mixed tumors of the salivary glands. For practical purposes, these studies are applicable to the so-called mixed tumor of the lacrimal gland. Ewing stated that the mixed tumors of the salivary glands were at first considered as carcinomas, and this conception remained undisputed until Kauffmann placed them in the group of sarcomas.

The work of Wartmann, later extended by the study of Volkmann, also placed these tumors in the class of endotheliomas. The work of Volkmann especially gave great impetus to the theory of endothelial origin. This theory was attacked by Hinsberg, who was supported by Ribbert, and their efforts ably demonstrated the carcinomatous nature of these tumors. Hinsberg's studies were largely responsible for the overthrow of the endothelial theory of origin.

Krompecher concluded that the mixed tumors of the salivary glands and of other situations were carcinomas belonging to the group of basal-cell carcinomas. As a result of his investigations, he saw fit to take an extreme view, contrary to well established biologic principles relative to histogenesis. He conceived the idea that in mixed tumors the basal epithelial cells, by a process of metaplasia, might produce true connective tissue and cartilage. This conception of Krompecher is conversely similar to the discarded theory of Virchow that carcinoma developed from connective tissue.

Ewing, in summarizing the knowledge at hand relative to the origin of mixed tumors of the salivary gland, made the following statements: "1. The endothelial origin has been disproved. 2. No single source of the mixed tumors meets all the requirements. Some are distinctly adenomatous, and probably arise from the acini and ducts of the gland in which they are well incorporated. Others are encapsulated or extraglandular, and take the form of basal-cell or adenoid cystic epithelioma. These probably arise from misplaced and, occasionally, embryonal portions of the gland tissue. Branchial remnants may possibly be connected with this group. 3. The derivation of mucous tissue and cartilage from gland epithelium has been satisfactorily proved, and there is no necessity of including in the originating tissue any cartilaginous structures."

It is well known that the epithelial cells of the so-called mixed tumors often show a great tendency to polymorphism. This is exemplified by the fact that in these tumors one finds round cells, oval cells, and spindle cells of various sizes; also stellate cells, columnar cells, cuboidal cells, and sometimes squamous cells with intercellular bridges or spines. These squamous cells often give evidence of formation of keratin, as manifested by the presence of pearly bodies. In addition to the polymorphic epithelial cells, one always finds fibrous connective tissue cells in these tumors, while stellate mucous connective tissue and cartilage cells are often found, and occasionally bone cells.

The epithelial cells of mixed tumors may be arranged in acini, tubules, or alveoli (with or without central degeneration). The tubules often produce a vascular effect. The epithelial cells also may be arranged diffusely, or in small, branching strands that appear to mingle with stellate mucous connective tissue and stellate cartilage cells.

In this intermingling of cells, there is produced a picture bearing a close resemblance to an astrocytoma of the brain. Tumors in which mucous connective tissue and cartilage are absent can usually be recognized as adenocarcinomas of the type of so-called mixed tumors. The polymorphism and arrangement of the epithelial cells are the distinctive features.

It might be possible to accept Krompecher's contention that fibrous connective tissue, mucous connective tissue, and cartilage can be developed from epithelial cells, if one could conceive the possibility that cells which had differentiated to a point at which they are recognizable as epithelial cells could undergo a "dedifferentiating" process and acquire a potential ability for tissue development that is possessed by certain teratomatous cells. But this does not seem reasonable, as far as the so-called mixed tumors of the lacrimal glands, salivary glands, and so forth are concerned, for these tumors have a low average of malignancy which indicates that their cells are not anaplastic to the extreme degree that one would expect to find among highly malignant teratomatous cells.

It is easy to conceive of the great potency for tissue development possessed by certain highly undifferentiated teratomatous cells; furthermore, it seems reasonable to believe that one of these cells could metastasize from its place of origin (testis, ovary, and so forth) to the lungs, and that there, by the process of differentiation, it could produce structures peculiar to all three germ layers. Various writers, Ewing especially, have called attention to the polymorphism possessed by epithelial cells of certain tumors; they may simulate smooth muscle cells, fibrous connective tissue cells, and mucous connective tissue cells. This polymorphism, as is well known, may be manifested in carcinoma of the lip, and especially in carcinoma of the thyroid gland.

As far as tumors of the salivary gland are concerned, Ewing is inclined to accept Krompecher's view relative to the development of fibrous connective tissue, mucous connective tissue, and cartilage from epithelium. He expresses the belief that under the influence of production of mucous and of secretion of ptyalin they appear to form an exceptional group; however, he is inclined to believe that most of the so-called sarcomas of salivary glands are typical epithelial growths.

When the reason for the presence of mucous connective tissue, cartilage, and sometimes bone in these so-called mixed tumors is sought, two theories have to be considered. One is that their presence, like that of fibrous connective tissue, indicates resistance on the part of the host. The other, which is based on Ehrlich's hypothesis, brought forth by him in the transplantation of carcinoma in lower animals, is that certain carcinomatous cells have a stimulating effect on certain other cells, such as fibroblasts and angioblasts; hence, that certain carcinomas are fibrous because the carcinomatous cells stimulate the growth of fibroblasts, whereas others are vascular (hemorrhagic) because certain carcinomatous cells stimulate the growth of angioblasts.

In keeping with Ehrlich's hypothesis, it is only logical to assume that certain carcinomatous cells in the so-called mixed tumors have the ability to stimulate the growth of mucous connective tissue, cartilage, and sometimes bone, in addition to fibrous connective tissue. One of us (Broders) has called attention to a case of adenocarcinoma of the cecum in which, in addition to fibrous connective tissue, there was marked formation of bone, in close association with the carcinomatous cells.

It is easy to understand that if one finds fibrous connective tissue in a neoplasm the presence of mucous connective tissue, cartilage, and bone would not be impossible, since all of these tissues are closely related. However, when the theory is advanced that connective tissues can develop from epithelial cells that have differentiated to the extent that they can be recognized as epithelial cells, we are compelled to dissent.

The Mayo Clinic.

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ELECTRIC CATARACT

T. B. Holloway, M.D.

PHILADELPHIA

In a boy of twelve years the shock from an electric current of 2,200 volts resulted in loss of vision first noted nineteen months after the injury, and both lenses were completely opaque twenty-nine months after the injury. Iridectomy and evacuation of the lens at the age of fourteen years resulted in vision of 6/12 for the right and 6/6 for the left eye. Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, January 16, 1930.

G. S., aged fourteen years, was admitted to the University Hospital July 2, 1929, complaining of defective vision in each eye.

The family history was negative, as was his general physical condition, except for the details that will be referred to. When four years old he was badly burned, and on examination extensive old scars were found on the left arm and elbow, the left shoulder, the left side of the chest, the right buttocks, and the lower part of the left thigh. For these burns several operations had been performed, presumably skin grafts. He gave a vague history of a severe electric shock in 1927.

The vision of each eye was reduced to hand movements at one-half meter. Extraocularly the eyes were negative. In each eye the cornea was clear, the anterior chamber slightly shallowed, and the pupil dilated. The lens was completely cataractous and of the soft white variety. There was a small irregular capsular plaque involving the lens, slightly down and in in the right eye, and central in the left. The light fields and projection were good.

As far as could be ascertained there had been no ocular signs or symptoms prior to December, 1928, when he had complained of defective vision with the right eye, and a few weeks later the left eye had been similarly affected. This was not accompanied by pain and no inflammatory signs were present.

With these historical and clinical findings, and negative laboratory results, including a normal blood sugar, I wrote his family physician, Dr. W. B. Henderson, for any further details that he could provide. He replied as follows: "When twelve years of age, January, 1927, electric shock and burns of neck. Fell from forty-foot pole on cross arm of which he was sitting when hand came in contact with wire; was unconscious for ten or fifteen minutes. Wire carried 2,200 volts. Witnesses relate seeing a flash as boy grasped wire. Was admitted to hospital for care of the burn on neck. Failure of sight first noticed when he started to school last fall, 1928".

On July ninth an iridectomy and evacuation of the lens were done on the left eye. The reaction was so slight that a similar procedure was resorted to on the right eye one week later. His postoperative course was uneventful. He was discharged August seventeenth with 6/12 vision for the right eye, and 6/6 for the left. Retention of the small plaque was doubtless responsible for the reduction of his vision in the right eye, for, as far as could be observed, the fundus of each eye was negative.

The essentials of the above case are therefore: A boy subjected to a shock from an electric wire carrying 2,200 volts. As far as could be ascertained the absence of any inflammatory signs. Failure of vision first noted nineteen months after the injury and, when first observed by me ten months later, or twenty-nine months after the accident, complete opacity of each lens. Successful operation with the restoration of useful vision. The absence of demonstrable fundus changes such as are at times found in cases of this character.

The literature contains rather frequent references to electric cataract, either as the result of exposure to the commercial current or that produced by lightning, but, despite this, but few cases come under the observation of any one man.

Probably the most characteristic feature of these cases is that the opacity does not develop until some days or months after the accident; most frequently within six months. When the lens becomes involved the process may remain partial or may go on to complete opacity.

Since the experimental work of Hess, certain of the older suggestions, such as those concerning the effect of heat, ultraviolet rays, and recurrent iridocyclitis, have been put aside. From his observations on rabbits Hess found that as the result of an electric discharge there occurred a destruction of the capsular epithelium with accumulation of fluid between the capsule and the lens fibers. Igersheimer believes the opacities analogous to those produced experimentally by Vogt with infrared rays.

The opacity may first appear in either the anterior or the posterior part of the lens. Thus, in cases observed by Ellett, Freysz, Posey, Lauder, Franklin and Cordes, and Camison, the opacities were anterior and were described as subcapsular or cortical, while in those recorded by Gowland and Löwenstein the opacities were in the posterior layers. Igersheimer found subcapsular with anterior and posterior opacities, as did Seggern. It is probable that the opacities most frequently begin anteriorly, but with their tendency to increase the time of observation would influence accurate statistical study. Koby refers to Koeppe's observations that in one instance bulbous protuberance of the epithelium or capsule was observed and in another instance a rosette was present in the posterior layers. In Gjessing's cases the opacities were subcapsular.

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THE FREQUENCY OF SYMPATHETIC OPHTHALMIA

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This consideration of the incidence of sympathetic ophthalmia is based upon the clinical and pathological material of the Illinois Eye and Ear Infirmary over a period of twenty years, including 1,465 patients with a history of accidental penetrating injury, beside 7,444 cataract extractions and 2,922 other intraocular operations. Of twenty-three eyes enucleated with a clinical diagnosis of sympathetic ophthalmia, eleven confirmed this diagnosis histologically. But the other enucleations are justified by the fact that we have no certain clinical means of deciding at an early stage whether we are dealing with sympathetic ophthalmia or with a less harmful infiltrating inflammation. Final diagnosis can only be made histologically, and even this may present some difficulty. Serial sections are necessary for the purpose. From the pathological department of the Illinois Eye and Ear Infirmary. Read before the American Academy of Ophthalmology and Otolaryngology, Atlantic City, October 21 to 25, 1929.

The cases here reported were selected from the records of the Illinois Eye and Ear Infirmary, covering a period of twenty years. The clinical diagnoses were made by the staff surgeons.

During this period of twenty years, 216,592 patients presented themselves in the eye department for treatment. Of these 24,404 were in-patients and 192,188 were out-patients, and 1,465 had a history of perforating injury. The following table (table 1) shows the distribution of the injuries according to age and sex:

Table 1

AGE AT WHICH PERFORATION OCCURRED

Age	0–10	11–20	21–30	31–40	41–60	61–85	Total
1909 to 1916	M.69 F.29	M.79 F.12	M.115 F.7	M.92 F.2	M.125 F.4	M.18 F.1	498 55
1914 to 1919	M.61 F.22	M.66 F.10	M.43 F.8	M.39 F.3	M.56 F.4	M.21 F.4	286 51
1919 to 1924	M.57 F.27	M.56 F.11	M.60 F.6	M.48 F.3	M.71 F.6	M.18 F.2	310 55
1924 to 1929	M.45 F.11	M.39 F.11	M.22 F.3	M.14 F.4	M.31 F.12	M.16 F.2	167 43
Totals	321	284	264	205	309	82	1465
Occurrence of sympathetic ophthalmia	4	1	1	1	2	1	-

It is interesting to note that since the Workman's Compensation law was passed in 1917 the number of perforating injuries recorded in male patients between the ages of 21-60 has decreased decidedly. The Infirmary is a state charitable institution and refuses admission to patients who come under this law.

As to 492 eyes enucleated, the lapse of time following injury ranged from forty-eight hours to forty years. (See table 2.)

Table 2

LAPSE OF TIME BETWEEN INJURY AND ENUCLEATION

Within 48 hours	Within 4 weeks	Within 4 to 8 weeks	Within 2 to 12 months	After 1 to 40 years
6	78	87	123	198

During these twenty years 7,444 cataract extractions were performed, and 2,922 other intraocular operations, including iridectomy and trephine. There were twenty-two enucleations after cataract extraction and twenty-nine enucleations after operations for relief of intraocular tension.

Thirty-one diagnoses of sympathetic ophthalmia were made. In this number of cases, twenty-three primary eyes were enucleated. The remaining eight refused consent to operation or wandered elsewhere. These patients showed symptoms in the second eye, the most important of which were ciliary injection, precipitates on the posterior surface of the cornea, cloudy iris pattern, and posterior synechiæ.

Forty-eight eyes were enucleated with the diagnosis of sympathetic irritation. These patients had in the second eye symptoms of lacrimation, pain, slight circumcorneal injection, and blepharospasm. Many histories mentioned diminution of vision, but this

was probably due to lacrimation and blepharospasm.

Of the twenty-three eyes enucleated with a clinical diagnosis of sympathetic ophthalmia, eleven confirmed this diagnosis histologically. Two eyes had chronic endophthalmitis with a mild infiltration of the plasma cells. Nine had atrophy following endophthalmitis, and two had posttraumatic chronic infiltrating iritis (iritis serosa, Fuchs[1]).

Among the forty-eight cases of sympathetic irritation were eleven of endophthalmitis with beginning atrophy, fourteen of traumatic iridocyclitis, and twenty-three of atrophia bulbi which showed fresh lymphocytic infiltrations. These infiltrations are probably responsible for the irritation in both eyes, as Zimmermann[2] has pointed out. The iridocyclitis cases showed varying degrees of round cell infiltration in the uvea and retina, with some fibrinous exudate.

I shall not give a detailed history of the cases of sympathetic ophthalmia, but shall tabulate them in the order in which they were received in the laboratory. In constructing this chart, I followed the headings used by Fuchs[1], adding the laboratory number, occupation, and service on which treated. (See table 3.)

The sympathetic inflammation followed perforating injuries in eight cases, cataract in two, and iridectomy for glaucoma in one.

Table 4 shows the percentages.

Table 5 shows the percentages of sympathetic ophthalmia found by various authors. This table was compiled from Peters[3] (Handbuch), Gradle[4] (American Encyclopedia of Ophthalmology), and Parsons[5, 6] (Pathology). There is no uniformity in the manner in which these percentages were obtained, so comparison would be of little value.

Referring back to table 1, it will be seen

Table 3

SUMMARY OF CASE HISTORIES

Lab. number	Name	Sex	Age	Occupation	Service	Cause of sympathetic inflammation	Lapse of time between injury and beginning of symptoms	Time between beginning of symptoms and enucleation	Course of inflammation and ultimate vision
1605	Geisler	M.	7	School	Nance	Struck with unknown object, half pearl button found in eye	5 weeks	5 weeks	Severe, 10/200
1621	Heekin*	F.	8	School	Wilder	Rifle discharged, multiple perforation	4 weeks	3 days	Severe, 20/70
1858	Worsham	M.	18	Clerk	Dodd	Perf. injury, linear extract., blow by fist	2 years after first injury	11 days	Severe, 20/200
1878	Sward	M.	34	Laborer	Lane	Perforation by chip of iron from hammer	3 years	8 days	Severe, 3/200
1902	Binder	M.	8	School	Findlay	Paring knife penetrated limbus	5 weeks	2 days	Mild, 20/20
2024	Cissna	M.	8	School	Barr	Rupture by blow	2 months	?	Very severe, fingers at 1 ft.
2131	Molitor	M.	52	Blacksmith	Woodruff	Cataract extraction followed by infection	4 weeks	6 days	Mild. 20/200 same as before op.
2440	Card missing	?	?	?	?	Central cornea perforated	?	?	?
2427	Gustavson	M.	56	Laborer	Goldenburg	Cataract extraction attempted	8 weeks	19 days	Very severe. V. not recorded
2566	McNamara	M.	62	Fireman	Lebensohn	Trephining, iridectomy	15 weeks	4 days	Mild. 20/20
2594	Ray	M.	24	Miner	Orcutt	Rupture of sclera by pool cue	4½ weeks	11 days	Mild with gl. 20/15+3

* Reported by Goldenburg, Amer. Jour. Ophth., 1918, Sept., p. 680.

Table 4

PERCENTAGES

	Perforating injuries	Cataract ext.	Other intraocular oper.
Number of cases	1465	7444	2922
Number of enucleations	492	22	29
Cases of sympathetic ophthalmia	8	2	1
Frequency	0.54%	0.027%	0.03%

Table 5

SHOWING PERCENTAGES OF SYMPATHETIC OPHTHALMIA FOUND BY DIFFERENT AUTHORS

Author	Percentage of sympathetic ophthalmia	How obtained
Becker	0.15	Percentage if in-patients
Bull	47.2	8 in 17 magnet extractions
Cohen	0.135	79 in 58,484 patients
Collins	0.9	Percentage of in-patients
Doman	3.1	387 perforating injuries, 103 children
Fuchs	13.3	24 in 180 injuries
Hobby	3.5	Percentage in perforating wounds
Kitamura	2.94	17 in 577 perforating injuries
Knies	3.0	
Krebs	6.0	11 in 181 intraocular foreign bodies
Mooren	0.134	Percentage of all clinic patients
Ohlemann	2.0	Percentage of infected wounds
Paly	19.0	86 in 450 diseases of the uveal tract
Reis	1.2	6 in 500 perforating injuries
Steindorff	3.34	42 in 1,255, 30 after severe injury
Theobald (this paper)	0.54	8 in 1,465 perforating injuries
	0.027	2 in 7,444 cataract extractions
	0.03	1 in 2,922 other intraocular operations
Weigelin	1.0	12 in 1,150 perforating injuries

that four of these cases occurred before the age of ten years and the others were evenly distributed over the following decades. It is the opinion of some authors that sympathetic ophthalmia is now less frequent. Our statistics do not show this, as the number of perforating injuries is less in the second ten years, corresponding to the decreased number of sympathetic cases.

The following chart shows the distribution of the cases over twenty years.

Table 6

DISTRIBUTION OF CASES OVER TWENTY YEARS

'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28
0	0	0	2	0	1	2	1	0	1	0	0	0	0	2	0	1	1	0	0

I need not give the full details of the histological picture of these cases, as it has been done many times since Schirmer's[7] monograph on sympathetic ophthalmia, in 1899, and E. Fuchs's paper in 1905. But I should like to point out some important facts on differential diagnosis between sympathetic ophthalmia and posttraumatic chronic infiltrative inflammation, and to present a few interesting details which I found in my slides.

Case number 2566 is a classical picture of infiltrative and proliferative uveitis. Fifteen weeks after a combined trephining and iridectomy the patient returned to the hospital complaining of diminished vision in the second eye, and showing a fine ciliary injection accompanied by many brown deposits on the posterior surface of the cornea. The sections show a uniform infiltration throughout the uveal tract. This has the characteristic arrangement of the infiltrating cells of sympathetic inflammation. In the iris the outer dark staining zone is formed by lymphocytes, and between it and the pigment epithelium is the light staining area formed by epithelioid cells. In the ciliary body the unpigmented epithelium is separated from the pigmented layer by the same infiltration. It is well preserved, while the pigmented layer is greatly destroyed. In the choroid the characteristic infiltration occupies the outer layers, while the choriocapillaris, lamina vitrea, and pigment epithelium are well preserved.

To show the clinical similarity and the anatomical difference between sympathetic ophthalmia and posttraumatic infiltrative uveitis, I should like to

cite a case from the service of Dr. Harry Woodruff, laboratory number P618.

Three or four weeks after an iridectomy for glaucoma, the second eye became injected and showed the usual symptoms of sympathetic ophthalmia. The injection was slight, lacrimation not noted. Photophobia and diminished vision were complained of. Deposits were present on the posterior surface of the cornea, the iris markings were blurred, and many posterior synechiæ developed. Treatment consisted of injections of autohemic serum, which apparently arrested the progress but did not improve the condition. The primary eye was removed eight months after the iridectomy. Serial sections were made and carefully studied for characteristic granulation tissue, but none was found. The following is a description through the coloboma area:

The scar of operation is just posterior to Schlemm's canal. There are many superficial and deep vessels throughout the cornea. The anterior chamber is very shallow, and is absent in places where the iris is tumefied and touches the posterior surface of the cornea.

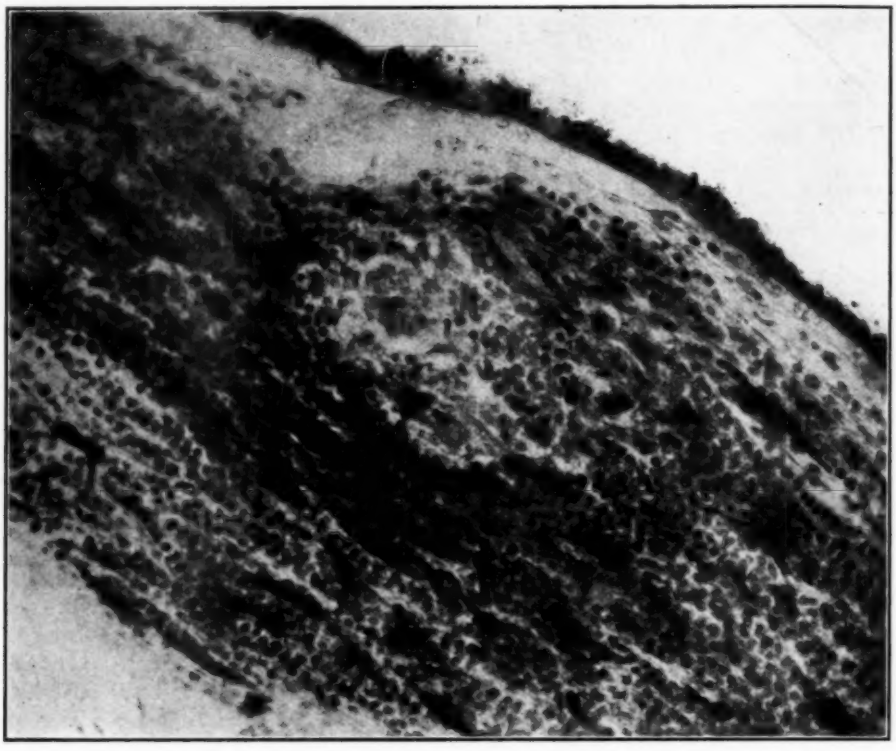

Fig. 1 (Theobald). Case no. 2566; typical granulation tissue of sympathetic ophthalmia in choroid.

The pupillary end of the iris is fixed to a pupillary membrane which is in close apposition to the lens capsule. This membrane reaches to the scar of operation and to the ciliary processes, pulling and stretching them forward. The ciliary portion of the iris is markedly tumefied and shows dense infiltration by round cells, especially in the posterior layers. These cells are lymphocytes and plasma cells. No epithelioid cells were found. The pigment layer of the iris shows destructive changes; it is partly or entirely absent partly proliferated. The pigment epithelial cells have migrated through the stroma of the iris and in many places reach the surface of the anterior limiting membrane. The posterior chamber is filled with connective tis-

sue, a continuation of the thick pupillary membrane. This membrane continues back to the ora serrata, and is also infiltrated with round cells. The filtration. Upon the nerve fiber layer there is a layer of connective tissue, increasing in thickness and covering over the optic disc. The optic nerve shows

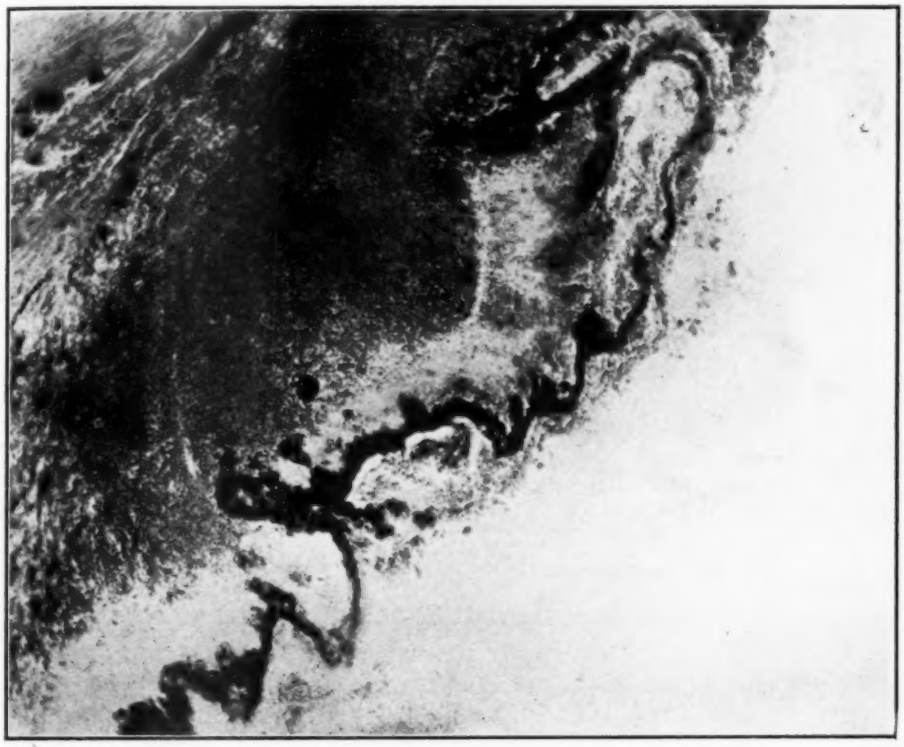

Fig. 2 (Theobald). Case no. 2566; ciliary body, showing typical granulation tissue of sympathetic ophthalmia.

infiltration continues back into the ciliary body, more marked in the processes. The pigment epithelium shows the same changes as in the iris. The same cellular infiltration is found hugging the ciliary processes and destroying the unpigmented epithelium. In parts the unpigmented epithelium is entirely destroyed. The infiltration continues into the choroid, with the same cells and the same degeneration and proliferation of pigment cells. The lamina vitrea is missing in many places. In the subretinal space are found occasional heaps of cells with more or less pigment content. Pigment cells are found migrating into the retina. The outer layers of the retina show changes of degeneration, the rods and cones being disintegrated especially opposite the site of the more dense choroidal in-

changes of secondary optic atrophy.

In the following case, 2594, it was difficult to reach a conclusion as to diagnosis. A few sections studied led to the diagnosis of posttraumatic chronic infiltrating uveitis. Later serial sections were studied and a single focus of proliferating epithelioid cells with a few giant cells was found in the ciliary body. Four and one-half weeks after the right eye was ruptured by a blow with a pool cue, the left eye showed a faint ciliary injection and small deposits on the posterior surface of the cornea. Vision was then 20/30. In spite of treatment the deposits increased and vision diminished. Eleven days after the symptoms began the right eye was enucleated.

The sections of case number 2594 show the iris was torn from its attach-

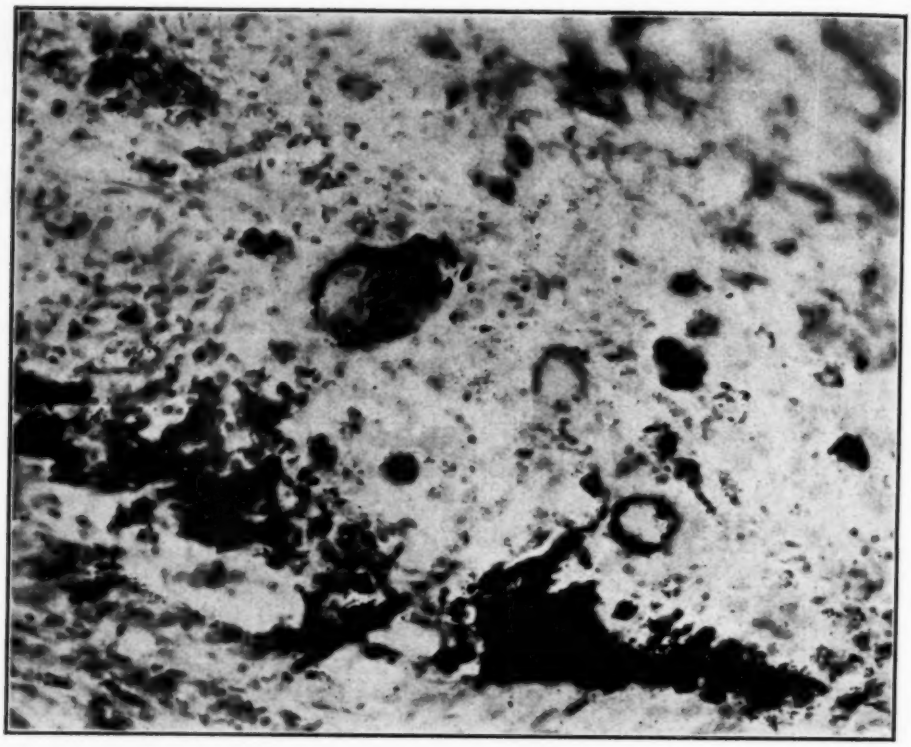

Fig. 3 (Theobald). Case no. 2594; ciliary body, focus of epithelioid and giant cells.

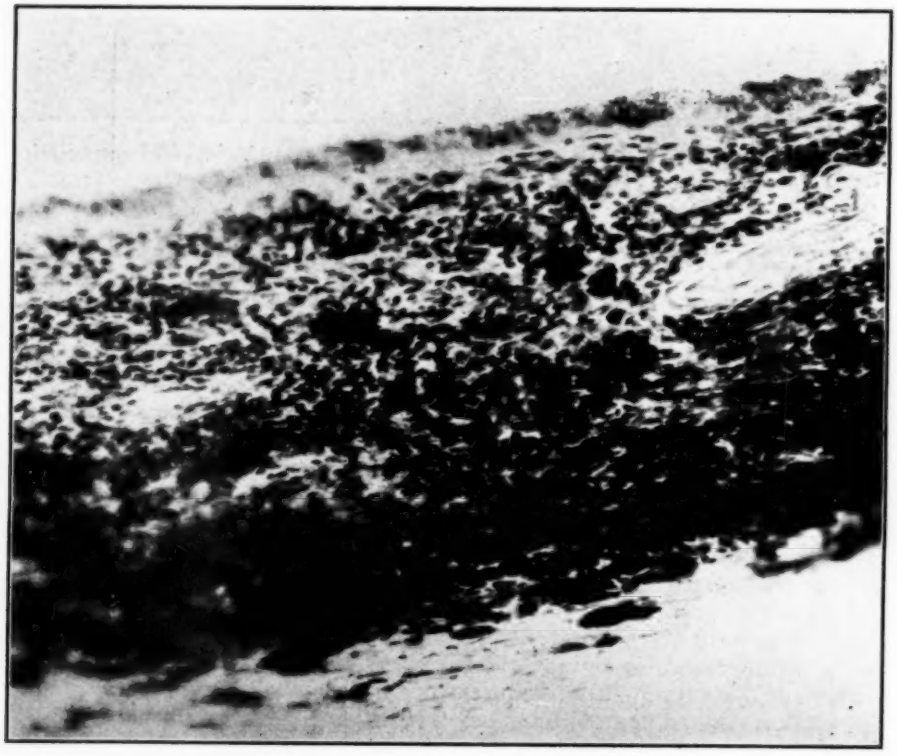

Fig. 4 (Theobald). Case no. 2594; round cell infiltration in choroid.

ment and doubled up on itself in the scleral wound, which is just back of the limbus. The lens is absent. The iris is atrophic and its pigment epithelium is degenerated. It is slightly infiltrated with round cells, and round cells infiltrate the connective tissue that encircles it. A thick band of connective tissue extends from the healed wound to the ciliary processes on the opposite side, pulling them forward. The anterior chamber is partially filled with blood. The ciliary body is atrophied and contains foci of round cells. In places its pigment epithelium is migrated. In the ciliary body on the side of the wound was found a single focus of epithelioid cells with a few giant cells. This would have been missed if serial sections had not been studied. On the side opposite the wound is a hemorrhage in and behind the choroid. This is probably the site of the blow. The choroid is uniformly infiltrated with round cells, which are lymphocytes and plasma cells. A small hemorrhage in the anterior vitreous is undergoing absorption, as evidenced by the many foreign-body giant cells bearing blood pigment, found in its vicinity and throughout the vitreous. Plasma cells are found scattered in the vitreous and lying on the retina. There is a slight infiltration around a few retinal vessels.

Case number 1902 presents the most interesting details of an early stage of sympathetic ophthalmia, which was first described by Dalén[8] and later interpreted by E. Fuchs[1]. The latter found this condition in four of his cases and emphasized its importance in the early diagnosis of sympathetic ophthalmia. These characteristic Dalén-Fuchs areas consist of small proliferations of the cells of the pigment epithelium of the uveal tract. In our case they are found in the ciliary body, symmetrically located. The layer of pigmented cells is separated from the lamina vitrea by heaps of cells with much protoplasm, large oblong nuclei, and one or two

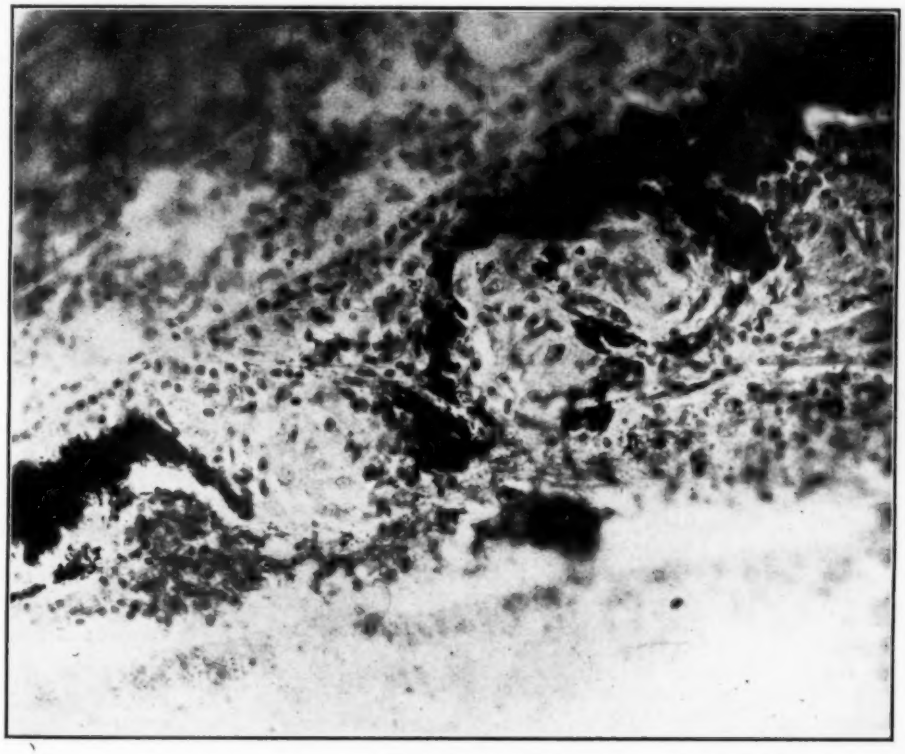

Fig. 5 (Theobald). Case no. 1902; Dalén-Fuchs area. Epithelioid cells replacing pigment epithelium of ciliary body.

distinct nucleoli. These epithelioid cells are derived from the pigment epithelium. This proliferation extends beyond the pigment layer, separating it from the unpigmented layer.

The clinical diagnosis of sympathetic ophthalmia presents many difficulties. Parsons[6] says that "the appearance of precipitates on the back of the cornea of the second eye is proof that sympathetic ophthalmia has already supervened". Adalbert Fuchs[9] tells us that "chronic infiltrating posttraumatic iritis is characterized clinically above all by precipitates,

Fig. 6 (Theobald). Drawings of Dalén-Fuchs areas, from Fuchs.[1]

resembling in this way sympathetic ophthalmia". It is possible that in the cases in which the primary eye was an atrophic globe the inflammation in the second eye was due to a focal or systemic infection, and had no connection with the injury.

A. Fuchs makes a nice anatomical differentiation between three clinically similar conditions. First, endophthalmitis affects the tissues lining the vitreous cavity, namely, the retina, ciliary body, and iris. It is an exudative inflammation, the exudate being composed of polynuclear leucocytes. When the endophthalmitis is of long standing, plasma cells are found in the tissues and also in the exudates. Second, in posttraumatic infiltrating chronic iritis the same tissues are affected, but these tissues are infiltrated with mononuclear cells. All of our cases had more or less cellular infiltration in the choroid. Third, sympathetic ophthalmia is an infiltration and proliferation within the uvea itself.

Schirmer's[7] statement, that the chief difficulty in dealing with sympathetic ophthalmia is that the diagnosis is always presumptive, still holds true.

Summary

(1) Our small statistics show the greatest frequency of sympathetic cases occurring in the first decade. There are four cases below the age of ten years, and only one case for each of the following decades.

(2) These statistics show that sympathetic ophthalmia is actually much less frequent than the enucleations which are done for sympathetic or for fear of sympathetic ophthalmia. However, the enucleations are justified, for with our present clinical knowledge we have no certain means by which to decide, at an early stage, whether we are dealing with sympathetic ophthalmia or with a less harmful infiltrating inflammation.

(3) Diagnosis can be made only histologically. This may present some difficulty, as case 2594 shows. For this purpose each eye must be sectioned serially and at least every tenth section carefully examined.

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OPTIC NEURITIS SECONDARY TO POSTNASAL SINUS DISEASE

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Much of the extensive literature with regard to the anatomical and pathological relationship between the optic nerves and the nasal accessory sinuses is reviewed. Statistical material as to optic neuritis and papilledema at Washington University is summarized. There is often a definite relationship of cause and effect between nasal sinus disease and optic neuritis; early diagnosis is necessary; and there should be no hesitancy in advising surgery when the evidence is reasonably definite and loss of sight is imminent. Read before the Saint Louis Ophthalmic Society, November 22, 1929.

It is conceded that ophthalmologists are constantly giving more consideration to rhinological possibilities for the relief of their patients. Their progress in this field has been materially advanced by internist, neurologist, pathologist, serologist, roentgenologist, and dentist, each of whom has contributed valuable information regarding the relation of nasal to eye diseases.

In optic nerve involvement, thorough investigation, early diagnosis, and specific treatment are of vital importance if the patient is to be safeguarded against permanent visual loss as the result of postneuritic atrophy. The literature abounds with etiological theories and gratifying case reports based upon a clinical diagnosis, but there is a lack of pathological confirmation such as has been secured in other fields of pathology. The argument is more clinical than pathological. Some writers have gone to extremes in attributing a great many ocular disorders to sinus disease, and they have confused the signs of intracranial pressure with the inflammatory lesions of the optic nerve.

Dr. Frank Billings[1] said: "When a systemic disease occurs which present knowledge associates with a primary infectious focus, the site of the focus must be located"; and Dr. Van der Hoeve[2] said: "The ophthalmologist has in the eye no sign at all to distinguish the origin of a retrobulbar neuritis; the rhinologist cannot say with absolute certainty that a person has no sinus trouble". In the first part of this paper I shall attempt to analyze the above statements.

The brilliant and painstaking investigations of Onodi[3], Sluder[4, 5], and Loeb[6] as to the anatomic relationship between the accessory sinuses and the optic nerve have added greatly to our comprehension of this subject. Loeb, in his dissection of the optic nerve and paranasal sinuses, described the optic nerve as passing externally from the chiasm along the roof or lateral wall of the sphenoid sinus, usually in slight relation with the last posterior ethmoidal cell, and thence to the eyeball through the periorbita.

In the optic canal the dural sheath of the optic nerve is transformed into the periosteum of the canal. The nerve, therefore, is here enveloped only by the delicate sheath, which in most places is applied to the periosteum and on the upper side is actually adherent to it.

The propinquity of the eye to the sinuses with their extensive mucosal coverings, the intimate relationship between nerves, vessels, and lymphatics as well as the sinuses which are exposed to repeated attacks of an inflammatory character, would speak for an association of pathological conditions even if specific details were not at hand.

Loeb[7] believed that the organisms or toxins from the diseased sinuses were borne either arterially or lymphatically direct to the optic nerve. Notably Zarniko[8] and Hajek[9], among the earlier writers, associated the changes in the nerve with a thrombophlebitis of the ethmoid and ophthalmic veins. Coffin[10] accepts this theory and says: "An almost constant finding in the mucosa of a chronically diseased sinus is a phlebitic condition of the vein".

Uffenordi[11] traced the anatomical condition of vessels communicating between the membrane of the sphenoid sinus and the optic sheath in the optic canal. Sluder[12] found lesions upon the

optic canal in life, by means of a Holmes nasopharyngoscope, both at the time of opening the sphenoid and as subsequent phenomena in the course of the disease. De Kleijn and Gerlach[13] demonstrated at autopsy an encapsulated diplococcus in the secretion and membrane of the sphenoid, in the optic sheath and nerve in the optic canal, and they followed it forward into the eyeball.

Gradle[14, 15] believes that an intimate relationship between the optic nerve and the posterior sinuses is not necessary as an etiological factor in disturbances of vision and that the trouble is transmitted by the soft tissues alone. The infection finds its way from the sinus mucosa to the orbital periosteum through the emissary veins and lymph channels, thence by continuity to the intracanalicular portion of the dura of the optic nerve, or possibly through the periosteal veins or dural veins directly to the central vein of Vossius. Skillern[16] thinks the greatest etiological factor is the circulatory disturbance of the nerve due to the pressure on the swollen mucosa and exudate, toxicity playing a secondary rôle. Dehiscences of the bony walls he also considers a factor. Warlow[17] accuses inadequate ventilation and drainage as predisposing factors in optic neuritis.

White[18, 19, 20, 21, 22], who has written extensively on this subject for some years, formerly believed that this infection reached the optic nerve from some infectious process in the adjacent sinuses either by direct continuity or by way of the blood stream. Recently he has arrived at the conclusion that the frequency of optic nerve disturbance from sinus disease is insignificant as compared with the frequency with which it is affected from other foci, including diseased teeth, tonsils, appendix, gall-bladder, fallopian tubes, and intestinal and genitourinary tracts. The bacteria may be compared with emboli loosened from the place of origin and carried in the blood stream to the smallest and often terminal vessels.

Sluder's[23] monograph states that in 1912 he thought that many of the cases, if not all, were to be explained by the inflammatory process either extending through or transmitting its toxins through the thin bony walls to the adjacent nerve trunks. During his later years, after a wider experience, he considered a more probable and serious factor which he described as the bone change in the hyperplastic process with or without periostitis. Further, he believed the mechanism of the disturbance was a narrowing of the bony canal through which the nerve passed. He described eight cases of optic neuritis due to postnasal sinusitus, of which seven cases showed definite improvement as the result of treatment.

Dr. Jonathan Wright[24], after examining Sluder's specimens of hyperplastic bone processes, reported that he had found both the absorptive or osteoclastic activity and the bone-forming or osteoblastic activity. He thinks that when the optic nerve is involved from bony pressure in the sphenoid or ethmoid sinuses, partial or complete blindness is pretty sure to occur. If the nerve involvement is recent or slight, the trouble may be due to pressure of the soft parts, to an extension of their inflammation, or to their vascular congestion. Objective evidence of inflammation spreading along the sheath of the optic nerve from the foci of inflammation in the sinuses has not been obtained. The papillary hypertrophy found in the mucous lining of the sinuses is attributed to the chronic suppurative type of sinusitus.

One should constantly keep in mind the difference between the suppurative and the nonsuppurative type of nasal pathology productive of eye lesions.

McMahan[25] states that chronic spheno-ethmoiditis is a distinct clinical entity in which the operative results are attended by a high percentage of improvement or complete recovery (74.3 percent). His pathological findings are described as follows:

Epithelium: thickening, sloughing, polypoid degeneration, metaplasia.

Basement membrane: thickening.

Tunica propria: edema, round cell in-

filtration, thickening of blood vessel walls, dilatation or compression of glands.

Periosteum: thickening.

Bone: osteoblastic activity, osteoclastic activity, hyperostosis.

Inflammation in the orbital part of the optic nerve is called retrobulbar or axial neuritis; while the intraocular form is described as intraocular or peripheral neuritis. Systematic writers describe two forms of intraocular neuritis: first, true inflammatory or exudative neuritis; second, papilledema or choked disc.

It is important to remember that, as mentioned by Parsons[26], "the optic nerve together with certain parts of the retina constitutes a lobe of the brain, and has therefore the characteristics of the central nervous system;" and further (in the words of Collins and Mayou[27]) that "the optic nerve is covered by membranes that are continuous with the brain membranes; namely, the dura mater, the pia mater, and the arachnoid".

Choked disc is commonly conceded to be a lymph stasis with a consequent venous engorgement due to mechanical pressure at the scleral foramen. De Schweinitz[28] reports the finding of brain tumor in eighty percent of his cases, while Uhthoff[29] found that next to tumor cerebral syphilis was the most frequent cause. Cushing[30] makes a categorical denial of the possible production of choked disc by sphenoid or ethmoid lesions without intracranial pressure. From time to time this problem has been the subject of controversy.

True or inflammatory neuritis is usually bilateral, with the sight generally much impaired. It manifests itself by no external signs except that the pupils are dilated to correspond with the diminution or absolute loss of vision. It is noted with the ophthalmoscope that the optic nerve and retina show vascular changes at first, followed by exudation and edema, and then by infiltration and hemorrhage; later, there is proliferation of the mesoblastic tissues of the vessel walls and neuroglia. The disc outline is more or less poorly defined, reddish or greyish discoloration indicating the presence of exudation in it. The retinal arteries are thinner, while the veins are distended and tortuous. Hemorrhages are often present near the disc, and the markings of the lamina cribrosa are invisible. The light sense, especially the perception of the light difference, is often much reduced.

Retrobulbar or axial neuritis is the type of neuritis which may be more easily overlooked, since the ophthalmoscopic examination may be entirely negative, so that early diagnosis must depend upon general examination and frequent field tests. It is well known that the blind spot of Mariotte, first described in 1688, corresponds to that portion of the fundus which has no visual elements, being occupied by the optic nerve as it enters the eye. Pressure upon the peripheral nerve fibers, within the canal, would involve the peripapillary bundles, with consequent enlargement of the blind spot.

Fuchs[31] thinks that the papillomacular bundle, although centrally located, is first affected because of its special vulnerability. Disturbance of its function results in a central scotoma.

Van der Hoeve[32] states that enlargement of the blind spot, first for colors and later for white, is the first sign of retrobulbar neuritis of nasal origin. He thinks that this is always the precursor of a central scotoma, which may occur in cases in which no serious disturbance of vision develops. Other frequent symptoms of retrobulbar neuritis, as mentioned by Stark[33], Cutler[34], and others, include enlargement of the blind spot, central scotoma for color, exophthalmos, swelling of the upper lid, dysfunction of the extraocular muscles, ptosis, variation in the size and reaction of the pupil, monocular or occasionally binocular impairment of vision, pain and tenderness in the orbit, and ophthalmoscopic appearances varying from the normal to engorgement and tortuosity of the retinal vessels with slight pallor of the disc.

The utmost precision should be ap-

plied to investigation of the visual fields, with special reference to scotomata. Several of the methods used for this purpose may be mentioned here. The confrontation test can be used for the periphery, but the perimeter is indispensable. The tangent screen and Peter's campimeter are very valuable in this examination. Scotometers designed by Priestley Smith, and also by P. C. Bardsley and R. H. Elliot, have combined the advantage of Smith's instrument with that of the Bjerrum screen for working at a distance of one meter. Bissell's blind spot slate, Haitz's stereoscope, and the magnet screen of Gradle are also valuable. Lloyd's stereocampimeter is especially adapted for the study of the blind spot and its anomalies.

It may be said in passing that various other conditions, such as myopia, glaucoma, disseminated sclerosis, toxic amblyopia, and pituitary lesions must be considered in the differential diagnosis of a suspected case of retrobulbar optic neuritis.

In a perusal of one hundred and twenty histories of cases of optic neuritis and papilledema at Washington University, which had been examined by members of the various departments of the faculty and subjected to laboratory examinations, the following data were obtained:

26 cases of spheno-ethmoiditis, of which 16 cases were surgical. Of these 26 cases, 21 were reported improved upon discharge.

2 cases of maxillary sinusitus.

1 case of frontal sinusitus.

5 cases of chronic tonsillitis.

25 cases of syphilis.

20 cases of brain tumor or suspected brain tumor.

7 cases of meningitis.

34 cases from miscellaneous causes, including pyorrhea and gastrointestinal, genitourinary, and blood disorders. Of these 34 cases, 28 were reported improved upon discharge.

A summary of the final condition of the 120 cases indicated that 49 were improved, 21 showed no improvement, 15 died, and 35 had no treatment.

A case of unusual interest was that of a man, P. J. F. aged fifty-one years, referred to me on June 14, 1927, with a bilateral reduction of vision. He complained of frequent occipital headaches and a dull aching or pressure on movement of the eyeballs, and he gave a history of failing vision for the past four months, which had followed a prolonged head cold. His previous history was generally negative, and he had always been an abstainer from alcohol and tobacco.

Upon examination of the eyes, his vision equalled 5/120 right and left, which glasses did not improve. Retinoscopy showed a plus 1.50 sphere right and left. The pupils were dilated to 5 mm. and were sluggish in reaction. The tension was within normal range with the Schiøtz tonometer. No superficial or ciliary injection was visible, and the anterior chamber and iris were normal. Ophthalmoscopic examination showed the cornea and media clear, the disc apparently normal or perhaps slightly hyperemic, the retinal veins engorged and tortuous. The form fields were moderately contracted, and oval central scotoma included the blind spot of 12 to 20 degrees, the blind spot being larger for colors than for white.

Nasal and postnasal examination revealed hypertrophied middle turbinates and a bilateral spheno-ethmoiditis.

The Wassermann report and the x-ray examination of the teeth were negative, while the sinus plates showed definite pathology of the posterior sinuses.

After about two weeks of observation and nasal treatment without improvement, the posterior sinuses were opened for aeration and drainage, followed by routine treatment. As a result, the eye condition showed progressive improvement, so that by November thirtieth the vision of the right eye with a plus 1.00 sphere equalled 20/19, and that of the left eye with a plus 1.00 sphere equalled 20/24, while with a plus 2.00 sphere added the patient read 3.5 point Jaeger type. At this time only a small amount of temporal atrophy was manifested by the ophthalmoscope and

visual fields. Later examinations, the last on March 3, 1929, were gratifying, there being no further complication.

While this case alone would not warrant a conclusion as to the relation of the degree of atrophy to interval between the onset of ocular symptoms and the resort to intranasal treatment and surgery, yet from the experience of this case together with the one hundred and twenty hospital cases above cited I believe we are warranted in making the following deductions:

(1) There is often a definite relationship of cause and effect between nasal sinus disease and optic neuritis, which calls for the closest cooperation between the ophthalmologist and the rhinologist.

(2) Thoroughness and promptness are necessary in the making of an early diagnosis, and, although I plead for conservatism, I feel there should be no hesitancy in advising surgery when the evidence is reasonably definite and loss of sight is imminent.

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THE ETIOLOGY OF LACRIMAL DISORDERS

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Every case of dacryocystitis should be investigated as to the possible existence of foci of infection elsewhere in the body, but especially as regards the teeth and upper respiratory tract. Removal of such foci will often lead to cure of the lacrimal disorder.

Lacrimal disorders characterized by the annoying symptom of epiphora which sooner or later becomes purulent occur very frequently. While much has been said about the treatment of this disturbance, relatively little attention has been paid to its etiology. The lacrimal apparatus is so accessible that when diseased the physician consulted is apt to think of relief only. Yet the treatment is often far from satisfactory.

The mucous membrane of the nasolacrimal duct is very vascular and the underlying structure is rich in lymphoid tissue. This membrane is thrown into folds which are of no special anatomical regularity. Some of these have been called valves, though their rôle as such is doubtful. (Whitnall.[1]) These folds swell under the slightest provocation, and they then offer sufficient obstruction to prevent proper drainage of the tears, and can become irritated sufficiently to form a locus minoris resistentiæ for infection from any focus, no matter how remotely situated.

According to Santos Fernandez[2] dacryocystitis is very seldom found in the colored races, due to the fact that the nasolacrimal ducts are longer and straighter. In infants, atresia of the nasal opening of the lacrimal canal and failure of absorption of the embryonic tissue in the nasolacrimal duct are often causes of dacryocystitis.

In adult life lacrimation is physiological in weeping and also in the presence of all sorts of irritations affecting the terminal expansion of the trigeminus. It occurs in facial neuralgia, migraine, hysteria, exophthalmic goiter, tabes, and pregnancy, and with foreign bodies in the conjunctiva. Tears may flow excessively during mastication, laughing, and coughing, due to forcible contraction of the orbicularis muscle. In old people relaxation of the orbicularis palpebrarum and decreased elasticity of the submucosa of the nasolacrimal duct may cause lacrimation.

Other causes are the pressure of eyeglasses; chronic inflammation of the lids and conjunctiva which has disturbed the normal relationship between the punctum and bulbar conjunctiva; ectropion in deeply set eyes where a triangular space intervenes between the lid and the globe; obliteration of the tear passages by burns or other traumatism; and foreign bodies or mycotic concretions in the canaliculi. Malgat[4] reports a case in which an abscess of the lacrimal canal was found to be caused by a piece of lettuce leaf driven into the nose, and thence into the nasolacrimal duct by repeated sneezing.

Stenosis of the lacrimal duct may also be caused by nasal polypi, disease of the accessory sinuses, scrofulous changes in the nasal mucous membrane, small abscesses in the sub-

mucosa of the nasal duct, acute rhinitis, and syphilis of the nasal bones.

Dacryocystitis is almost always secondary to stenosis of the naso-lacrimal duct, the great majority of such cases following acute or chronic diseases of the nose. Thus Kruch[4] in 1888 found impairment of the nasal mucosa in thirty out of thirty-five cases. Lacrimal abscesses may be traced to chronic pharyngitis with involvement of the mucous membrane of the nasal cavity and lacrimal duct, producing true stricture which interferes with drainage, followed by development of pathogenic organisms. According to de Schweinitz[5], in scrofulous persons exostosis of the nasal duct is a cause of stenosis. Systemic diseases, such as tuberculosis and lues, are also causes of dacryocystitis.

For the past several years every case of dacryocystitis coming under my observation has been carefully examined for foci of infection, and when such was found it was treated first. The dacryocystitis, sometimes to my surprise, then cleared up very quickly under the simplest treatment, such as probing and washing out the canal; only a few treatments were necessary to establish a permanent cure. To illustrate this I have selected a few cases which are described below.

Case 1: M.H., a woman forty years of age, came to me on December 12, 1921, suffering from chronic ethmoiditis and antrum suppuration on both sides. Polypi and pus were found in both middle meati. She likewise had purulent dacryocystitis, for which she had received conservative treatment from several good ophthalmologists, but with no relief. They had advised extirpation of the sacs, but this she had refused. It was only after some persuasion during her nasal treatments that I was permitted to dilate and irrigate her lacrimal ducts. The same treatment had previously been carried out by others but with no effect. As the nasal condition cleared the dacryocystitis subsided. Five years later I heard from the patient that there was no epiphora. I am convinced that it was the clearing up of the infection in the nose that made possible the cure of the lacrimal affection.

Case 2: M.L., male aged forty-two years, was seen on January 17, 1925. Complaint, discharge from right eye. Diagnosis, purulent conjunctivitis, non-specific. Argyrol and cold compresses cleared up the conjunctivitis but pus could be expressed from the lacrimal sac on the same side. Treatment with irrigations and probes gave no relief. Six months later, I was informed that a dentist was treating an infected tooth and would extract it with my permission. This was granted immediately, and the eye symptoms disappeared. This case revealed to me the relation of the focal to the ocular infection.

Case 3: S.K., woman aged thirty years, tearing of right eye for four months. Purulent matter expressed from sac. She was treated in New York City, where she resided, with probes which only made the condition worse, so that finally the smallest probes could not be passed and she was advised to undergo an operation establishing a new and permanent opening into the nose. The right antrum was filled with pus, probably residual from a recent cold, as there were no symptoms. This was washed out several times with perfect results. The eye condition improved, probes could again be used successfully, and the patient was discharged as cured within a month. When heard from two years later, she had had no recurrence.

Case 4: E.C., aged thirty-five years, female. Dacryocystitis of left eye. Chronic pansinusitis and infection around three teeth. The latter were extracted, the sinuses were operated upon; the eye was treated with probes and irrigations, with complete recovery. The eye symptoms recurred six months later. More pus found in the sinuses, which were treated with good result. This recurred again six months later. This time treatment only improved the condition but did not cure it. The patient still has epiphora from time to time but refuses further treatment.

Case 5: J.H., woman of sixty-two years. Dacryocystitis of right eye for several years. Several infected teeth were present. These were removed, and the eye symptoms cleared after irrigations. No probes were used in this case. No recurrence since her treatment two years ago.

Case 6: J.G., man thirty-six years of age. Acute dacryocystitis of left eye. Ozena with pus in left antrum. This was washed and cleared out. The eye symptoms disappeared after two probings and three irrigations. There has been no recurrence during a period of three years.

Case 7: Z.S., woman aged sixty-two years. Dacryocystitis, left side for one year, at times with pain. Pus found in the right antrum, which cleared up with irrigations. The eye symptoms disappeared after a very few treatments.

Case 8: J.C., woman aged forty-six years. Acute dacryocystitis of left eye with epiphora of the right. She had badly infected tonsils, with pus exuding. Suction was used on the tonsils. A probe was inserted once on the left side, none on the right. The nasolacrimal ducts have remained patent and the epiphora has ceased. It is now one and a half years since she was treated, and there has been no recurrence.

These cases seem to indicate that dacryocystitis is either secondary to nasal infection or due to a focus more remotely situated. Eliminating such infection, we have frequently cured a disease which in the past was so difficult to handle without operative procedure, particularly in elderly people who were apt to neglect dental and nasal infections. Within recent years ophthalmologists have recognized focal infection as an important factor in diseases of every other part of the eye and its adnexa. If remote foci of infection can cause optic neuritis, uveitis, and so on, why should the lacrimal sac be spared? Besides, the lacrimal apparatus, as shown above, is so much more vulnerable and therefore more easily infected.

In conclusion, I may say that it behooves us to scrutinize every case of dacryocystitis for some focus of infection, and to remove the latter. In many cases we shall thus cure the lacrimal disease, not only without an operation but without injury to the diseased parts, and with great benefit to the patient.

1908 Eutaw place.

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[1] Whitnall, S. E. Cited by J. M. Ball in "Modern ophthalmology", p. 35, F. A. Davis Company, 1926.
[2] Santos Fernandez, New Orleans Med. and Surg. Jour., 1918, v. 70, March.
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PEPYS' EYE COMPLAINT

HANS BARKAN, M.D.
SAN FRANCISCO

The extract which is here reproduced from the "Philosophical Transactions" of 1668 tells of an odd device in leather which Pepys had attached to his spectacle frame to keep out extraneous light when reading.

Just as we are interested in our own eyes and in the eyes of our patients, we are all also interested in the accounts which have appeared from time to time regarding the eye complaints of famous men in history, from Nero to Goethe, Lincoln, and others.

To the best of my knowledge no collection of the eye complaints of the famous Samuel Pepys has ever been presented. It happened that I came across an "extract" in the "Philosophical Transactions" of the Royal Society of London of July 13, 1668, which extract undoubtedly indicates the experiences that induced Pepys to try the tubes for his eyesight which he describes in his diary. The dates of the extract in the "Philosophical Transactions" and the dates of Pepys' comments on the like topic in his diary fall in the same year. In his quaint way he rejoices in the use of the tubes.

Here is the extract, followed by Pepys' further comments as selected from his diary.

Excerpts from

An Extract of a Letter Concerning an Optical Experiment Conducive to a Decayed Sight Communicated by a Worthy Person, Who Found the Benefit of It Himself

("Philosophical Transactions", no. 37, page 727, July 13, 1668, Royal Society of London)

". . . . I have mourned for the loss of my eyes. . . . . I know not, whether by standing much before a blazing Fire, or by writing often right before a bright Window, or what else might be the cause of this decay of my sight, who am not above 60 years of age. But I seemed alwayes to have a kind of thick smoak or mist about me, and some little black balls to dance in the air about my eyes . . . . as if I cam into a room suddenly from a long walk in a great Snow. But so it was, I could not distinguish the Faces of my acquaintance, nor Men from Women in rooms that wanted no light. I could not read the great black English Print in the Church-Bibles, nor keep the plain and trodden paths in Fields or Pastures, except I was led or guided. I received no benefit by any *Glasses*, but was in the case of those whose decay of sight by age is greater than can be helped by *Spectacles*. The *fairest* Prints seemed through Spectacles like *blind* Prints, little black remaining.

". . . . I took Spectacles that had the largest Circles; close to the semi-circles, on the over-part, on both sides, I cut the bone; then taking out the Glasses, I put black *Spanish* leather taper-wise into the emptied circles, which widen'd enough (together with the increasing wideness of the Leather) took in my whole eye at the wider end; and presently I saw the benefit through the lesser taper-end, by reading the smallest Prints that are, as if they had been a large and fair Character. I caused a Glover to sow them with a double-drawn stitch, that they might have an agreeable roundness, and exclude all rays of light. So I coloured the Leather with Ink, to take off the glittering, and this was all the trouble I had, besides the practice and patience in using them. Only, finding that the smaller the remote orifice was, the fairer and clearer the smallest Prints appear'd; and the wider that orifice was, the larger Object it took in, and so required the less motion of my hand and head in reading; I did therefore cut one of these Tapers a little wider and shorter than the other; and this wider I use for ordinary Prints, and the longer and smaller for smallest Prints; These without any trouble, as oft as I

see need, or find ease in the change, I alter. I can only put the very end of my little finger into the orifice of the lesser, but the same finger somewhat deeper, yet not quite up to the first joint, I can insert into the orifice of the wider. Sometimes I use one eye, sometimes another, for ease by the change; for you must expect that the visual rays of both eyes will not meet for mutual assistance in reading, when they are thus far divided by Tubes of that length.

"The lighter the stuff is, the less it will cumber. Remember always to black the inside with some black that hath no lustre or glittering. And you should have the Tubes so moveable, that you may draw them longer or shorter, allowing also (as was newly intimated) the orifice wider or narrower, as is found more helpful to them that have need of them. To me it was not necessary, but I conceive it convenient that Velvet or some gentle Leather should be fastened to the Tubulous part next the eyes, to shadow them from all the encompassing light.

"I have already told you, that I found no benefit at all by any kind of Spectacle-glasses, but I have not tryed, what glasses will doe, if setled in these Tubes; having no need of them, I rest as I am. . . . . And probably they may be more proper for some that are *squint-eyed*, whose eyes doe interferre, and so make double and confound the object, as if you would write one line upon another, where, though both should be ever so fairly written, yet neither will be easily legible. Here *Squint-eyes* will be kept in peace, and at fair Law. Certainly it will ease them that cannot well bear the light, and perchance it will preserve the sight for longer durance".

An Extract Of Another Letter from the Same Hand . . . .

(page 729)

". . . . And having used these empty holes for Spectacles little more than a week, I can now use them without trouble all the day long; and I verily believe, that by this little use of them, my sight already is much amended. For I do now see the greenness of the Garden and Pastures in a florid verdure, whereas very lately dark colours, blue and green, had the same hue to my eye.

"If you ask me how this device came in my head, I shall tell you all I do know. Some years agoe I was framing one of *Helvetius's Polemoscopes:* As I was trying the Tube, without the Dioptrick Glasses, I perceived that, though the Tube took in very little, and seemed scarce serviceable for any considerable purpose, yet the object appeared to me more distinct and clear through the Tube, than through the open Air . . . . and thereupon made trial and found the effect fully to answer to my case . . . .

". . . . give me leave to add, that if I had consulted with the learnedst and wisest men living, I make no doubt but I should have been disappointed of all relief; and perhaps I might have lost the Crepuscular remains of my sight by adventurous essayes upon such a tender organ."

"I must not let this pass without inserting here a few Notes some of which referre to those Observations, you received from Dr. Lower, and communicated in the late mentioned No. 32.

2. That in Man, and Beast (in Horses at least) the right eye is the weakest and most frequently failing.

3. That the pupil or black of the eye is wider and larger in those that are short-sighted, than in those that see at greater distance.

". . . . the Tubes may be of paper only colored black and pasted on, and with the inner folds to be drawn out from one inch to three; some of the folds to be taken out, that the orifice may be wider or narrower, as best fits to every degree of defect."

(Spelling as in the volume of transactions.)

Samuel Pepys' "spectacles".

(Extracts from his diary, 1668-1669.)

July 31, 1668: ". . . . my eyes being now past all use almost; and I am mighty hot upon trying the late printed experiment of paper tubes."

Aug. 11, 1668: ". . . . and thence at the Office all the afternoon till night, being mightily pleased with a little trial I have made of the use of a tube-spectacall of paper, tried with my right eye."

Aug. 23, 1668: ". . . . to examine my letter to the Duke of York, which, to my great joy, I did very well by my paper tube, without pain to my eyes."

Dec. 4, 1668: ". . . . and therefore wrote a letter at the Board, by the help of a tube, and . . . . ."

Jan. 28, 1669: ". . . . and here I did find that Mr. Sheres hath, beyond his promise, not only got me a candlestick made me, after a form he remembers to have seen in Spain, for keeping the light from one's eyes, but hath got it done in silver. . . . ."

Feb. 17, 1669: ". . . . though my eyes mighty bad with the light of the candles last night, which was so great as to make my eyes sore all this day, and do teach me that it is only too much light that do make my eyes sore. Nevertheless, with the help of my tube. . . . . I did venture to write . . . . without hurting my eyes any more than they were before, which was very much. . . . ."

March 1, 1669: ". . . . I did also bring home a piece of my face cast in plaister, for to make a vizard upon, for my eyes."

March 12, 1669: ". . . . I to write down my Journall for the last week, my eyes being very bad, and therefore I forced to find a way to use by turns with my tube, one after another, and so home to supper and to bed."

April 25, 1669: ". . . . and thither comes Lead with my vizard, with a tube fastened within both eyes; which, with the help which he prompts me to, of a glass in the tube, do content me mightily . . . . to write down my Journal for the last twelve days: and did it with the help of my vizard and tube fixed to it, and do find it mighty manageable, but how helpfull to my eyes this trial will shew me."

April 29, 1669: ". . . . understanding that the mistress of the house, an oldish woman in a hat, hath some water good for the eyes, she did dress me, making my eyes smart most horribly, and did give me a little glass of it, which I will use. . . . ."

May 8, 1669: ". . . . and there comes Lead to me, and at last my vizards are done, and glasses got to put in and out, as I will; and I think I have brought it to the utmost, both for easiness of using and benefit, that I can."

490 Post street.

SOCIETY PROCEEDINGS

Edited by Dr. Lawrence T. Post

CLEVELAND OPHTHALMOLOGICAL CLUB

January 14, 1930

Dr. W. E. Bruner, chairman

Surgery of the lids

Dr. E. B. Heckel (Pittsburgh), by invitation, read a paper on this subject in which he referred to the fact that in industrial life it was not uncommon for accidents to result in more or less destruction of facial contour. Eyelids are torn, lacerated, and often destroyed as the result of burns.

As a rule, even in severe burns, the muscles remain intact, but the real deformity results from the immense contraction following the skin destruction, producing an eversion of the conjunctiva and constant exposure of the eyeball, which destroys the corneal transparency and results in loss of vision.

It is simple enough to restore the lid by replacing the contracted muscles and covering them with an epithelial layer, but the real problem is in anticipating an adequate graft, so that when the final contraction has taken place the covering will be sufficient. In grafting, the epithelial layer is preferable to whole-skin transplantation, as the former results in a thin pliable skin surface, blending in with the surrounding normal skin, while the latter is bulky and in itself a deformity.

The operative procedure generally requires a general anesthetic, preferably ether. The operation conveniently divides itself into four distinct stages:

1. Dissection of the lid so as to expose and prepare the underlying muscles.
2. Fixing the lid in a stretched position by anchoring it with several guy sutures.
3. Taking of the graft.
4. Placing the graft in position, dressing, and bandage.

For satisfactory taking of the graft, it is essential that it be held firmly and evenly in place, the first dressing after the operation remaining on from four to seven days. In cases where both lids are involved the operative procedure must be divided, as it is impossible to restore both lids at one operation.

Discussion. Dr. A. B. Bruner inquired of Dr. Heckel whether a narrowing of the palpebral fissure occurred after plastic surgery on the lids in extensive burns.

Dr. Heckel replied that such a condition occurred occasionally, but could easily be remedied by further minor operative procedure.

Dr. J. E. Cogan asked if the speaker ever used metal clips in plastic surgery.

Dr. Heckel answered that they were impractical as metal clips accentuated scarring.

Dr. P. G. Moore inquired as to what procedure was best in preventing displacement of the prothesis after enucleation.

Dr. Heckel thought that the simple enucleation employed in the Vienna clinics yielded best cosmetic results, and was preferable to gold ball, glass ball, and fat implantation.

Dr. M. P. Motto asked whether the speaker had ever employed sliding flaps in grafting, or human hair in suturing.

Dr. Heckel said he had used sliding flaps but had found the Thiersch method more effective. In suturing he employed very fine black silk, and he had found that the best results were obtained if sutures was not drawn too taut.

M. Paul Motto,
Secretary.

CLEVELAND OPHTHALMOLOGICAL CLUB

February 13, 1930

Dr. W. E. Bruner, M.D., chairman

Glioma of the retina

Dr. Ralston gave a brief review of the subject of glioma before presenting the patient, bringing out its clini-

cal characteristics, macroscopic and microscopic, and also the prognosis of such cases. His patient was a child four and one-half years old, the youngest of six children. Examination of the other children did not disclose any evidence of a similar condition, all having good vision. The parents were advised of the seriousness of the condition, but declined to give their consent for enucleation.

Discussion. DR. W. E. BRUNER said that it was the opinion of every ophthalmologist that the only thing to do at this point was to take the eye out at once in order to save the child's life. He had chanced to see several of these cases. Some years ago a patient came to him with a diagnosis of tumor in the eyes. Enucleation had been advised. Ophthalmoscopic examination of the other eye revealed a small glioma in the posterior portion of the eyeball, not far from the optic nerve. Removal of both eyes would have increased the possibility of saving the child's life, but he did not want to take the responsibility. Radium was tried, but with only temporary relief. The tumor began to grow and the second eye was finally removed. There was a recurrence, but not in the second eye. The parents did not want anything else done. The child evidently died from a metastasis.

Glass in the eye for four years or more

DR. W. E. BRUNER cited this case primarily to demonstrate how easily a piece of glass in the eye was overlooked. The patient had received an injury four years previous to Dr. Bruner's examination. During this entire period the eye was kept closed and was decidedly irritated. Examination of the eye showed a long sliver of glass, extending into the limbus region from the nine to the six o'clock position. An incision was made at the limbus and the glass was loosened and then removed with forceps.

Discussion. DR. M. P. MOTTO cited a recent case of similar nature reported in the American Journal of Ophthalmology. Upon first examination, the glass was not disclosed to view, due to considerable exudate and hemorrhage in the anterior chamber. Four months later the glass was located by slit-lamp examination. The ophthalmologist in this case advocated the use of the slit-lamp because of its positive accuracy in demonstrating the presence of any foreign body.

Embolism of central artery

DR. W. P. CHAMBERLAIN showed a case in which such a condition was brought on by sudden and severe strain. The patient, a carpenter forty-seven years old, had no history of previous eye trouble. Two days after the injury the right eye showed vision of 5/30 and the left eye light perception only in the extreme temporal field. There was no abnormality of external structures, except moderate dilatation of the pupil with entire absence of direct pupillary reaction. The patient's general physical condition was negative. Ophthalmoscopic examination showed closure of the central retinal artery in the left eye and retinal hemorrhages in each eye.

Discussion. DR. KEYES demonstrated sections of the optic nerve and retinal vessels from a similar case examined. This condition went on to glaucoma and later to enucleation of the eye.

Chronic iridocyclitis

DR. W. P. CHAMBERLAIN presented the case of a woman of fifty years whom he had observed for a period of thirteen years. In 1917 iritis was was present; in 1924 glaucoma, which in the period of one week was followed by acute iridocyclitis. Glaucoma again recurred in 1929 and 1930. Acute iridocyclitis developed after an attack of glaucoma and was treated with atropin without any increased tension, whereas the tension had been 70 mm. Hg only a week previously. Eserin proved very efficient in controlling the tension, and never failed to give prompt results in each of her three attacks of glaucoma. The present condition of this patient's eye was normal in every respect, except for small posterior synechia.

Discussion. Dr. M. P. Motto said it seemed to him that Dr. Chamberlain's case brought out one important fact, that perhaps we had been too radical in our treatment of glaucoma. Personally, had he had the case in question, he might have been tempted to operate in 24 to 48 hours had not the tension come down to what he would have considered a safe risk. Wessely of Munich, when asked whether he liked the Elliot operation or performed an iridectomy in such cases, said he did not like to operate at all. He would rather indulge in medical treatment, but when necessary preferred the Elliot operation and even then wondered if it was worth while, as generally medical treatment was again resorted to. Possibly we had been too hasty. In the future the speaker would treat these cases more conservatively, giving medical treatment preference.

Ocular trauma treated by foreign protein

Dr. Paul Moore had applied this treatment to a patient struck in the eye by a tack. Examination of the left eye showed a lacerated wound of the cornea, marked circumcorneal congestion and hypopyon. The pupil was covered by a thick pupillary membrane and vision limited to light perception. Atropin solution was instilled and 50,000,000 typhoid bacilli were injected intravenously in each of four injections, each three days apart, with various reactions. A fifth injection of 75,000,000 was followed by a slight reaction. During this time the pupillary membrane was entirely absorbed, and with the daily use of powdered dionin and atropin most of the adhesions between the iris and the lens were broken. In this case the absorption of the pupillary membrane resulted in restoration of central vision.

Discussion. Dr. Moore, answering Dr. Ralston's question as to why he chose typhoid rather than milk or diphtheria antitoxin, said that, although milk products were generally used, a quicker and better reaction was produced with typhoid.

A case of retrobulbar neuritis

Dr. M. W. Jacoby presented the case of a man fifty-three years old who complained of severe pains about the left cheek and below the left eye. Some time after onset of pain the left eye lid drooped slightly and ached at intervals, with some dimness of vision. A month later, under local anesthesia, turbinectomy and ethmoidectomy were performed, and ten days later a radical antrum operation was done on the left side, with radium implantation. In this case no primary new growth existed in the nose or nasopharynx and the original trouble was apparently in the ethmoid or sphenoid cells. That retrobulbar neuritis should develop did not seem strange, but it did seem strange that the literature did not mention malignancy of the sinuses as a cause of retrobulbar neuritis. The prognosis of such cases was very good under surgical intervention and the use of radium.

Neurinoma of the orbit

Dr. J. E. L. Keyes reported the case of a white boy two years old, whose parents complained of prominence of the right eye of three weeks' duration and poor health for several months. Examination showed right monocular exophthalmos, this eye protruding 2 mm. farther than the left. There was also restricted movement in the field of the right external rectus. An exploratory operation was undertaken, and a hard nodule could be felt through the elevated periosteum and among the orbital contents. The periosteum was opened and an apparently well limited firm nodule, about the size of a small marble, was exposed. Exploration of the orbit revealed no further pathology. The patient died nine days after the operation and strenuous endeavors to obtain a postmortem were unsuccessful. The diagnosis made by the pathologist was one of neurinoma. There had been a great deal of confusion in the definition of neurinoma and neurofibroma. On looking up the definition it was found that neurinoma was a tumor of the nerve; neuroma a tumor

or new growth largely made up of nerve substance; neurofibroma a connective tissue tumor of nerve fiber bundles.

M. PAUL MOTTO,
Recorder

COLORADO OPTHALMOLOGICAL SOCIETY

December 21, 1929

DR. C. E. WALKER presiding

Lacerated wound of eyeball

DR. W. H. CRISP presented a man, aged thirty-six years, who four weeks earlier had received a V-shaped cut in the left eye, involving cornea, sclera, lens and probably the ciliary body, from a bottle fragment. Dr. R. W. Danielson had covered the cornea with a double conjunctival flap. The eye remained red and photophobic. The iris was caught in the corneal scar. The lens had apparently undergone a good deal of absorption, but there was only a partial fundus reflex, and the vision was limited to vague outlines of large objects. Would there be definite advantage in attempting to divide the anterior synechia?

Discussion. DR. EDWARD JACKSON stated that on several occasions he had been struck by the rapidity with which these eyes cleared up after the section of iridic adhesions. It should be remembered that all such eyes ought to be kept under observation. It was his impression from the single examination that this eye would probably quiet down without sympathetic involvement.

DR. C. E. WALKER dwelt upon the fact that the ciliary body of this eye had been involved in the injury and that this was the most important single feature. He felt that there could be no useful vision and that the eye would be lost ultimately, and that there was much danger in leaving such an eye in too long. He thought that it should be removed.

DR. MELVILLE BLACK suggested the removal of the remaining lens substance in order to hasten recovery.

Preretinal hemorrhage

DR. JAMES M. SHIELDS presented Mr. A. W. W., aged twenty-six years, who was seen with a preretinal hemorrhage in the macular region of the left eye on November 15, 1929. The hemorrhage had appeared a half hour after the lifting of a fifty-pound weight. The case had been shown at the November meeting. There was seen in the macular region a sausage-shaped hemorrhage projecting forward and slightly downward and temporally into the vitreous. Vision was reduced to 6/20. The sausage-shaped hemorrhage later became hourglass in shape, the upper half being bright red in color and the lower half very dark, as in all preretinal hemorrhages. The lower forward tip still later became bifurcated, showing two distinct knobs. At this meeting the case was again presented. Vision had returned to normal; but no definite scotoma could be elicited. The macular region presented a finely granular, slightly pigmented appearance.

Discussion. DR. JACKSON thought that when he first saw the case about five hours after its occurrence in November there was much edema and therefore the vessel from which the hemorrhage occurred was not seen at that time. However, at the present time a vessel was clearly visible in the region of the hemorrhage, and it was entirely possible that the bleeding had occurred from this vessel.

Diabetic cataract

DR. JOHN MCCAW exhibited Mr. E. P. W., aged twenty-six years, a machinist. He was admitted to the hospital in July, 1926, in diabetic coma. By the use of large doses of insulin, 150 units daily, consciousness was soon regained and his life saved. During the night of October 20, 1926, the vision of both eyes was suddenly lost. At the time of examination on the following day bilateral diabetic cataracts were diagnosed. The left eye had been needled six times. The last needling opened a large aperture through the lens substance so that at the present time with a plus 11 D. sphere the eye had practically normal

vision. The only complication encountered in relation to these needlings was a rise of tension after the last operation. This was controlled by the use of eserin salicylate and hot packs. The other details of this case were reported in the proceedings of this Society for October, 1928.

Discussion. Dr. James M. Shields mentioned a case in which a diabetic cataract had developed during a period of ten days, in which time the vision was reduced to perception of light.

Dr. Strader mentioned a case of diabetic cataract he had seen recently, in which the vision had changed very rapidly from hyperopia to myopia.

Dr. Frank Spencer reported a case of typical bilateral diabetic cataract which had developed in a woman of thirty-nine years, within a period of three months.

Monocular trachoma

Dr. John A. McCaw also presented Mr. C. F. R., aged thirty-four years, locomotive engineer, who stated that six years ago a hot cinder had lodged on the cornea of the right eye and that after its removal an ulcer had formed. Some time either before or after this occurrence the eye had become infected with trachoma. Treatment had been given at different times during the past four years. The vision had been gradually reduced to 20/200. Examination of this eye showed a drooping of the upper eyelid. The conjunctiva of the upper eyelid was thickened, as was also the tarsus. A few trachoma bodies were submerged in the conjunctiva at the inner end of the tarsus. The semilunar folds and caruncles contained trachoma bodies. The cornea was very irregular and vascular. The interesting feature was the involvement of the semilunar fold and the part that this played in keeping up the irritation of the eye. Bacterium granulosis had been obtained from the secretions by Dr. Phillips Thygeson.

Discussion. Dr. William H. Crisp mentioned three cases in which the clinical appearance so resembled trachoma that such a diagnosis would have unquestionably been made by most ophthalmologists. However, in each of these three cases the clinical appearance was due to some extraneous influence or infection.

Dr. Edward Jackson referred to the work of Dr. McHenry in regard to the treatment of trachoma, described at the last meeting of the American Medical Association.

Dr. G. L. Strader emphasized the point that Dr. McHenry had made in regard to close inspection for trachoma follicles in the caruncle. He stated that the late Dr. Gifford had emphasized this point more than thirty years ago.

Renal retinitis

Dr. William C. Finnoff showed Mr. A. L. S., aged thirty-six years. When first seen on May 21, 1929, he had complained of blurred vision and frontal headaches after close work. Under cycloplegia, hyperopia and hyperopic astigmatism were found and lenses were prescribed. At that time the media were clear, the vessels good, and the fundi otherwise normal. The patient had had scarlet fever as a child, with acute nephritis, and had had trouble off and on ever since. He had been in the hospital eight years ago on a milk diet. For the past three years he had been on a salt-free diet, since he had had Bright's disease and for the past four years had been running a high blood pressure. The systolic blood pressure had averaged 180 mm., and the diastolic had remained constant at 112 mm. The renal function test had been low. Albumin and all types of casts were always present in the urine.

He continued to work without difficulty until the fourth of November, 1929, when he was seen again and complained of blurred vision in the left eye. At this time, with correction the vision of the right eye was 20/20—, and of the left eye 20/70+. The center of objects seemed blurred. The outline of the left disc was obscured, and numerous flame-shaped hemorrhages were present in the fundus, surrounding the disc. There were a few small white transudates scattered over the posterior

pole. The blood pressure was 170/112. There were small hemorrhages in the region of the disc of the right eye, and the disc margin was slightly blurred. The condition progressed rapidly, and when the patient was last seen the vision of the right eye was 20/200 and that of the left 6/200. Both discs were markedly swollen, with edges blurred. There were hemorrhages and exudates throughout the fundus, with typical transudates in each macula.

Proptosis

Dr. William C. Finnoff also showed Mr. S. H., aged fifty-one years. Four years ago he had become very nervous and had lost weight, with typical symptoms of toxic goiter. Shortly after the appearance of the general symptoms the eyes began to protrude and had remained prominent ever since. He was advised to have a thyroidectomy but refused operation. The basal metabolic rate in 1925 was plus 41. The nervous symptoms gradually disappeared and he regained his normal weight (240 pounds) and the sense of well-being. The proptosis, however, continued. He consulted Dr. Finnoff on September 30, 1929, because of an increase in the proptosis of the right eye, and stated that this symptom had become worse in the last three or four months. The vision of the right eye was 20/20 plus, and of the left eye also 20/20 plus. The basal metabolic rate was —19. The thyroid gland was not enlarged and there was no evidence of hyperthyroidism. X-rays of the skull were negative. The eyes protruded straight forward and were only slightly restricted in their motion.

There was no bruit or evidence of a mass in either orbit. The goiter was pronounced quiet, and he was advised against operative interference. The cornea of the right eye was 33 mm. in front of the outer orbital rim, and the cornea of the left eye measured 27 mm. from the corresponding point. There was slight congestion of the veins of the right eye, otherwise the fundus was normal. The visual fields were slightly constricted, but the patient's answers were very inaccurate.

Foreign body

Dr. W. A. Sedwick reported the case of S. J. H., aged forty-seven years, school teacher, and a very intelligent patient. He had come for refraction in August, 1929. He stated that perhaps two or three times a year his right eye would become swollen and slightly red, with some pain, and that this passed off in twenty-four to thirty-six hours. On everting the lid of the right eye the patient complained of some pain from the pressure. Nothing of significance was seen. The tarsal conjunctiva was quite red and somewhat follicular in character and there was a small amount of serous discharge. The patient was told that he had a catarrhal conjunctivitis and that it should be treated before an examination was made. The patient returned the following day, and when the lid was everted he again complained of pain. A more thorough examination was made, and there was found and removed from the upper fornix a pine twig 15 mm. long and 1.5 mm. in diameter. At first the patient was not willing to believe that the twig had been removed from his eye. However, he finally vouchsafed the information that nine years previously, when on a run-away horse, he had been carried through a pine copse. He had sustained a slight corneal wound, which healed kindly under the care of an oculist. He made positive statement that at no other time or in any other way had he ever been in an accident or in any circumstances in which it would have been possible for this to occur.

Donald H. O'Rourke,
Secretary.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

January 21, 1930

Dr. W. Holbrook Lowell presiding

Late postoperative separation of choroid

Dr. G. S. Derby showed a patient with separation of the choroid which had oc-

curred eight months after a trephine operation.

Discussion. Dr. F. H. Verhoeff thought this separation of the choroid might simply be caused by low intraocular pressure. Fuchs's theory that the fluid in the anterior chamber empties itself into the perichoroidal space had been generally abandoned. He thought it important to find out if there were any leakage through a break in the conjunctiva at the site of the wound. This probably could be determined by instilling fluorescein. If there were such leakage, it should be remedied. If the leakage persisted, the choroidal separation would probably return, even after scleral puncture.

Juvenile glaucoma

Dr. James J. Regan showed a girl of eight years, first seen January 7, 1930, complaining of failing vision. She had been referred from school on account of poor vision in the spring of 1929. In August, the family physician, after examination, stated that the child was "run down."

Examination of the eyes showed no congestion; the corneas were large, measuring 12.5 mm. right eye, and 12 mm. left eye. The anterior chambers were deep. Vision with the right eye was faulty light projection, and with the left eye fingers at six feet.

Ophthalmoscopic examination showed atrophy of both optic nerve heads with marked glaucomatous cupping. Both nasal fields were lost, and the temporal fields were contracted below. Both eyes were very hard to digital palpation.

On January 8, 1930, an Elliot corneoscleral trephining, with iridectomy, was performed in both eyes. On January 18, 1930, vision of the right eye was 20/100 plus; vision of left eye 20/100. Descemet's membrane seemed normal, establishing the case as one of megalocornea with juvenile glaucoma, rather than buphthalmos.

Possible sympathetic disease following sarcoma

For Dr. S. J. McDonald, Dr. W. C. Cameron demonstrated a patient who, on September 3, 1929, had shown in the left eye marked injection, steamy cornea, and pain. Fundus was not seen. Tension was 64 mm. Right eye was negative with vision 20/20. In the hospital adrenalin injection raised the tension to 90 mm. Iridectomy was performed on September 9, but caused no improvement. Though vision was nil the patient refused enucleation. On September 28 he returned with left eye hard, very irritable, pupil fixed, and anterior chamber shallow. Enucleation was performed and the patient discharged in a week. The right eye was then normal, with vision 20/20.

On October 10 the patient was readmitted with iritis in the right eye. Vision was fingers at fourteen feet. The eye had been sore and painful for four days. There was general injection and descemetitis, with many cells and much débris in the anterior chamber. No nodules were seen in the iris. The pupil was attached to the lens except at the 11 and 1 o'clock positions. The fundus was not seen. The tension was subnormal. The patient was treated for iritis and was discharged in November with vision of light perception.

The pathological report in the latter part of November showed sarcoma of the left choroid with extension outside the globe, and no definite evidence of sympathetic inflammation.

On December 7 the patient was again readmitted with irregular pupil, plastic iritis, and pigment deposit on lens. Tension was low. Vision was perception of light.

On December 9, after negative sensitization, thirteen doses of diphtheria antitoxin of 20,000 units each were given on successive days. The eye had since cleared generally and vision had improved to fingers at six feet.

The speaker said that Dr. Verhoeff, from present appearances, did not believe the case was sympathetic.

Discussion. Dr. George S. Derby stated that clinically the eye showed sympathetic disease but pathologically it did not. How could one choose between the two diagnoses?

Dr. F. H. Verhoeff stated that the

sarcoma in this case had no significance except that it was the reason for operating. The iris was incarcerated in the wound but was free from infiltration, as were also the whole uvea and the tumor itself. Theoretically it would seem possible that sympathetic uveitis could occur even when the exciting eye had been removed so early that it showed no microscopic evidence of the disease, but this had never been actually demonstrated.

Sarcoma of the iris removed by iridectomy

Dr. F. H. Verhoeff showed a patient seen with a pigmented tumor at the periphery of the iris and apparently involving the root of the iris. The patient was seen by several other ophthalmologists, and they all agreed that the safest way was to remove the eye. Since the other eye was amblyopic, Dr. Verhoeff decided that it would be best to attempt to remove the tumor without sacrificing the eye. After using pilocarpin it was obvious that the tumor did not extend quite to the root of the iris. With a very small Graefe knife he made a fairly large incision, coming out at the root of the iris. He then made a radial cut in the iris, first on one side of the tumor and then on the other, and excised the piece of iris containing the tumor.

Dr. Verhoeff, in reply to Dr. Wheeler, said he thought the tumor would have obstructed the view of the filtration angle with the gonioscope.

Pulsating exophthalmos with especial reference to treatment

Dr. John Wheeler reported that the first case of this kind that he had ever seen was one of Dr. Jack's. The common carotid was tied and the patient died four weeks later. Dr. Wheeler did the autopsy and obtained a very remarkable specimen in which there was a large aneurism of the carotid. The opening into the cavernous sinus was no larger than a pin head. He imagined that there was more noise from a small hole than a large one.

He had seen a child who had typical pulsating exophthalmos after falling on the rib of an umbrella. The rib had perforated the lid and penetrated the orbit. Dr. Lincoln Davis did a Krönlein operation and ligated all the dilated veins he could find in the orbit. The exophthalmos disappeared and the vision and ocular motions became normal.

In a case of typical pulsating exophthalmos following a contusion of the head, an incision had been made in the lid at the upper margin of the orbit and as many veins ligated as possible. Then there was a tremendous hemorrhage which was checked by packing the orbit. The exophthalmos was cured, but there was no sight in the eye afterward. Dr. Wheeler had had no opportunity to try this procedure in another case. Probably it would be a good plan to remove the eye, cut the large veins, and pack the orbit.

Discussion. Dr. W. Holbrook Lowell reported that some years ago he had seen, in consultation, a case of monocular exophthalmos. There was at that time no bruit and the eye was equally proptosed. Dr. Courtney found the case negative from a neurological standpoint. Dr. Quackenboss, after careful examination, suggested an orbital tumor and advised an incision behind the globe. No pus was found. Two weeks later the doctor referring the case reported that a bruit had developed.

Dr. George S. Derby stated that he was interested in what Dr. Wheeler said about not hearing the bruit in some of these cases. In a paper on head surgery the view was expressed that in all cases an examination of the head with the stethoscope should be made. He remembered a woman who complained of a noise in her head. A diagnosis of vascular tumor of the brain was made and the patient was treated by x-ray. She improved somewhat but still complained of the noise. The bruit could be detected very distinctly with the stethoscope. He thought perhaps the medical men's inexpertness of which

Dr. Wheeler spoke was partly due to the fact that they were unaccustomed to putting the stethoscope on the lids and waiting until the movement of the lids did not disturb the sound.

DR. ALLEN GREENWOOD stated that two weeks ago he had received a telegram from a friend who was practicing in a small town in the state of Washington. He said, "I have a case of pulsating exophthalmos. What shall I do for it?" Dr. Greenwood had wired him to compress the common carotid several times daily until the patient's brain was used to the lessened blood supply and then to ligate the common carotid.

Conjunctivitis from imperfect prothesis

DR. S. J. BEACH reported that recently a patient had called up complaining that she could not wear her artificial eye because it was irritating the socket. It was a new eye and he advised her to put it in a short time each day until she got used to it. Recalling the report made before this society by Dr. Rowland on an infected prothesis, he mentioned the incident to the patient. A week or ten days later she reported again that the socket got better with collyrium but infection recurred every time the eye was inserted.

On careful examination the artificial eye showed no visible crack nor was any fluid line to be seen on holding it up to the light. On twisting it, however, it broke cleanly into two parts along a line of cleavage close to the flat portion, and the inside was found to be moist. A new eye was obtained and the trouble had not recurred. This case showed that the absence of a fluid level in the artificial eye did not preclude the possibility of infection within.

Discussion. DR. F. H. VERHOEFF said he had a patient who had complained that he was giving off an extremely disagreeable odor. On examination it was found that he was wearing an artificial eye that was cracked and contained putrid fluid.

S. J. BEACH,
Secretary.

ROYAL SOCIETY OF MEDICINE, LONDON

Section of Ophthalmology

February 14, 1930

MR. CYRIL WALKER, president

Distichiasis

MR. J. H. DOGGART presented a girl aged seven years, who for a year had had red and watery eyes. There was no history of a similar affection in any other member of the family. Each of the four lids had a row of accessory cilia arising from the posterior part of the intermarginal surface, finer than the normal cilia. Only a few cases of the condition had been recorded. The histology had been first described by Kundt, who demonstrated the absence of meibomian glands, which were replaced by a row of accessory cilia, with sebaceous glands opening into their follicles. Brailey had later confirmed these observations. Several instances of more than one case in a family were on record. Some regarded the condition as reversion to an ancestral malady. Usually it did not cause symptoms in the first few years of life. He proposed to treat this case by electrolysis, one lid at a time, under general anesthesia; this method was preferable to surgical section.

Discussion. DR. COCKAYNE said there seemed to have been very few cases in which the condition was hereditary; he could not find more than five in the records.

MR. LAW spoke of a case in a woman who had a double row of lashes in one lid only. He had excised the accessory row of cilia by cutting out a V-shaped section and including the lashes as far as he could, and suturing. It was true that there was a tendency to ectropion of the normal row in cases such as this, but that had not followed in the case of which he was speaking. When he saw the patient six weeks later there seemed no tendency to recurrence of the accessory row.

Binocular detachment of retina

MR. A. F. MACCALLAN showed an eight-year-old boy who had injured the left supraorbital region in a fall and since then in order to pick up articles had had to go down on his hands and knees to see them. His visual acuity recently was 6/36 with plus eight sphere in the right eye, and 6/36 with plus two cylinder axis vertical in the left. In each eye there was a detachment of the retina, and in the upper part there was a yellow band. The general health was good, and the Wassermann negative. Opinions were asked as to whether anything further could be done for the boy.

Discussion. MR. A. HUGH THOMPSON showed a case of double detachment in a boy aged nine years, who had hypermetropia of 9 D. in each eye. In the right eye an old detachment overhung the central part all around. In the left eye the detachment was not nearly so deep.

MR. CYRIL WALKER referred to the case of a boy aged nine years who had a detachment in both eyes, with much haze in the vitreous. Six years afterward, when the boy was twenty years old, it had been found that he was in the Army Service Corps, and in spite of a double detachment he was able to get 6/60 vision and to do good useful work.

MR. ARTHUR GRIFFITHS showed on the screen a picture of the eye of a patient whom he had exhibited two years ago, with lines of scar tissue similar to those in Mr. MacCallan's case. It was clear that the scar tissue was in the retina.

Retrobulbar neuritis due to nasal sepsis

MISS ROSA FORD related the further history of a case in which, in October last, the retrobulbar neuritis had been thought to be due to latent sinusitis. At a later stage the antrum was opened from the cheek, and a mass of polypoid tissue could be seen on the temporal wall of the antrum. One of the polypi was removed, and it measured one-half inch in diameter. From it were cultivated the streptococcus longus, the viridans, and the albus. There seemed to be needed a more conclusive diagnostic test of a case of latent sinusitis, because an extranasal operation could not be done on every case of doubtful nature.

Papilloma of conjunctiva

MR. ARTHUR GRIFFITHS showed a section of this tumor which had moved freely over the sclera. It was excised, a quarter of the thickness of the cornea being included. A plastic operation was carried out on the conjunctiva.

Parinaud's conjunctivitis

MR. MORGAN showed a boy aged seventeen years, with this disease. The boy had not been in contact with horses. A month ago the eye in question was irritable, and the preauricular gland began to swell. There was now on the surface a sloughing area which had increased in size. Cultivations from the surface had been done several times, but with negative results, and the gland had diminished without suppurating. Vincent's angina and syphilis could be excluded.

Discussion. MR. WILLIAMSON-NOBLE spoke of a case which looked like one of Parinaud's conjunctivitis, with a large preauricular gland. He had excised this lesion with most of the conjunctiva. Material injected into a guinea pig gave negative results. He dissected out the whole gland, and got tubercle reaction.

Colloid bodies in the choroid

MR. HUMPHRY NEAME showed a patient twenty-four years of age, the vision of whose left eye had been getting defective in the last few months. When Mr. Neame examined him three weeks ago, he found the vision in the right eye was 6/9 although there was only one-fourth of a diopter of astigmatism. The left eye seemed to be emmetropic, and the vision in that was only 6/36, one letter. He could find no floating vitreous opacities, and therefore he thought there was no evidence of active inflammation, and so he

fell back on the presumption that there were colloid bodies in the choroid. He thought it likely that the low vision in the left eye was congenital.

Discussion. MR. M. HEPBURN said the case did not appear to him to be like one of colloid degeneration of the membrane of Brück, but rather one of retinal degeneration in the macular region, produced by some disease of the choroidal blood vessels. If that were so, unless a cause for the vascular trouble could be found and successfully treated, the prognosis was bad. The right eye seemed to be the seat of the same change as the left in an early stage.

Unusual coloration of sclerotics

MR. R. FOSTER MOORE read a paper on this subject based on the case of a woman aged fifty-four years, who had been admitted to the hospital because of rheumatoid arthritis, for which she had been treated for some years. The Wassermann test was positive. She had alopecia, but it was not supposed to be due to syphilis. The blue coloration of her eyes was, in his experience, unique. At first he thought it was a case of blue sclerotics, but she had not had any bones broken, and there was no similar condition in members of her family, so she did not belong to that group. The slit-lamp showed innumerable particulate dots which could be resolved, and which were not related to the normal pigment of the eye. The woman had taken a number of medicines, but apparently none containing silver. Thirty years ago she had had a long course of iron and arsenic.

Discussion. DR. PARKES WEBER thought this a case of argyrosis.

MR. E. R. HART referred to a case in in which carbolic oil, used for treating an ulcer, had resulted in a blue coloration of the cartilages of the ear.

The red field and optic disc resistance in glaucoma and allied conditions

MR. RANSOM PICKARD, of Exeter, read a paper with many illustrations projected on the screen on this subject. He explained that he had two purposes in view in doing this work: to study (1) the red field in glaucoma, and (2) the factor of resistance of the nerve head to the intraocular pressure. He could not, as a result of this four years' work, lay down any definite rules, but the findings were of value.

As far as possible the cases dealt with in the paper were not selected. Red 10/1000 was chosen instead of green for comparison with white 3/1000, because red was more easily identified than green at the margin of the field. The size of the field was estimated by adding the angles subtended by it along the eight principal radii, dividing the total of these by eight and using the result as a standard of comparison. The diameter of the blind spot or other scotoma was subtracted from the radius or radii in which it appeared. In his paper in 1921 he had shown that in normal discs it was exceptional to have a cup area of over forty percent. In the present series the numbers were

	40 percent or under	*Over 40 percent*	*Totals*
Tension over 27 mm.	3	32	35
Tension 27mm. or less	5	33	38
Intermittent glaucoma	1	6	7
	9	71	80

It would be seen that the series had, as a whole, exceptionally large cups, and yet the cups below seventy percent might be passed by many as "physiological." The tension of the cases was estimated by the Schiøtz tonometer, the fingers also being used. In this paper fifty-seven patients were dealt with, most of them being between fifty-five and seventy-four years of age. In all the groups there was a preponderance of the female sex.

In the cases of low tension it was shown that there was enlargement of the disc cups comparable to that in the cases of definitely raised tension, therefore the resistance of the nerve head was less in the former than in the

glaucomatous group, a point which he had set out to prove in this paper. In a previous paper he had suggested that the cause of this weakness was "cavernous atrophy."

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

February 17, 1930

Dr. Robert Warner, chairman

Steel in the eyeball

Dr. Hilliard Wood presented D.C.D., male, aged sixty-four years, first seen February 8th.

The previous day, while striking a hatchet with a hammer, something had hit him in the left eye. The eye became inflamed, painful, and the vision impaired. The vision of the left eye was 20/65. There were moderate irritative symptoms. Immediately below and to the left of the center of the cornea appeared to be a small recent corneal perforation. Just under this perforation the left pupillary margin of the iris appeared wounded, and immediately under that a section of the lens seemed to be opaque. No satisfactory view of the fundus could be had. Transillumination showed a perforation of the iris near the pupillary margin. X-ray showed the foreign body to be situated about one-half inch back of the cornea, very near the temporal wall of the sclera, and slightly below the horizontal level. Through an incision made in the sclera the foreign body was withdrawn with the giant magnet.

On February 18th, the corrected vision of the left eye was 20/65. There was a circumscribed haziness of the lower outer section of the lens.

W. W. Wilkerson, Jr.,
Secretary.

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RETINAL DETACHMENT

Retinal detachment has been numbered, and by most ophthalmic surgeons is still numbered, among the hopeless diseases of the eye. With few exceptions, there has been a general opinion that the prospect of spontaneous cure, while very slight, was fully as great as that of relief from surgical intervention of any kind.

Not very long since, Gonin, after a relatively silent interval of several years (see Gradle's paper in the American Journal of Ophthalmology, April, 1930), again claimed an important percentage of successes with his method of ignipuncture. Other workers have been less satisfied as to the value of this form of treatment. But it must be admitted that the technique of the procedure is still young and is perhaps rather vaguely understood by those who have had only limited experience in its application.

Among those who have reported favorably as to Gonin's procedure, Vogt, rather more than a year ago (Klinische Monatsblätter für Augenheilkunde, volume 82, page 620), reported eight cases in which ignipuncture had been employed, four of them having been cured. The same author has since performed the operation on seventeen further cases. Of his first series a fifth case is now to be reckoned among the cures, and a sixth patient of this earlier series has been decidedly improved. The series reported by Gonin himself in 1928 included twenty-six cases.

Vogt's analysis is a most fascinating contribution to ophthalmic literature. It considers the ophthalmoscopic examinations which have preceded the use of the new operation, together with the results of single or repeated ignipuncture in the same patients, in the light of a scientific investigation into the anatomical basis of retinal detachment; and offers a number of very definite conclusions. Vogt is entirely

in agreement with Gonin that the immediate cause of spontaneous retinal detachment is the formation of one or more holes in the retina; but from Gonin he differs in that he attributes the development of such holes to traction upon the retina by diseased and abnormally mobile vitreous humor.

Most of Vogt's cases have been operated upon more than once. In addition to a résumé of the earlier cases, with their recent history, he gives a terse account of each of the seventeen later cases. Several of these case histories include details which are most significant, alike as to the scientific implications of the method, and as to the value of persistent study and effort in dealing with even the apparently most hopeless cases of "spontaneous" detachment.

A woman physician of thirty years, with high myopia, slowly developed a large retinal detachment in the right eye, with reduction of the corrected vision of this eye to barely 1/10. At first no trace of retinal hole could be found, but careful search meridian by meridian, from optic disc to ora serrata, disclosed two small holes, the smaller lying about four disc diameters from the ora serrata, in the area of greatest detachment. After very careful localization this smaller hole was closed by ignipuncture. In a few days the visual acuity showed decided improvement, while at the first ophthalmoscopic examination, ten days after operation, the retina was everywhere completely replaced. The cure, with corrected vision of five-tenths, had lasted six months at the time of report.

A man of thirty-one years had lost the sight of the right eye fourteen years earlier from spontaneous detachment. The sight of the left eye, with myopia of sixteen diopters, had become cloudy one week before the patient's first visit to Vogt. The retina was almost completely detached, and presented no less than seven tears and holes, all in the quadrant between the twelve and three o'clock positions. In all, with intervening relapses and the appearances of four more retinal holes, six ignipuncture operations were done on this eye, the vision, at first 1/50, having reached 5/20, with persistence for eight weeks at the time of report.

Of Vogt's combined series of twenty-six cases (including one due to traumatism) seven have been cured and five are still under treatment. Excluding cases in which there is apparently a malignant tendency to increased tearing or hole-formation in the retina, Vogt believes that we can count upon curing from forty to fifty percent of cases of spontaneous retinal detachment by ignipuncture of the hole in the retina.

Vogt emphasizes the significance of the fact that in only two out of twenty-five cases of relatively recent spontaneous detachment was it impossible to discover a hole or tear in the retina; and he declares that every future theory of the etiology of spontaneous detachment will start from the conclusion that this accident is directly due to a hole in the retina. The detailed findings in such cases include two especially interesting phenomena. The first is the constant recurrence of destruction of the vitreous body, a condition which is known to be the rule in the high myopia of adults and which is also frequent in senile nonmyopes. The second is the presence of destructive changes in the peripheral retina, consisting of reticular patterns, white lines branching like a moss, and in whose vicinity are encountered thin-walled spaces probably corresponding to areas of cystoid degeneration.

There are likely to be differences of opinion concerning Vogt's belief that the retinal hole or tear is directly produced by traction connected with sudden displacement ("Schleuderung" or "slinging") of the excessively fluid diseased vitreous; although Vogt urges that this belief is supported by the facts that in pathological specimens the fragment of retina which has been separated from the rest of that structure is always found displaced toward the vitreous and never toward the choroid, and that its edges are curled back toward the vitreous and not toward the choroid. If it be supposed that there is normally a difference of pressure

in favor of the vitreous as against the subretinal space, then such a difference will be effective in maintaining the normal position of the retina, but only so long as the retina is intact, while the rapidly curative effect of successful ignipuncture may be accounted for by restored continuity of the retinal membrane.

Vogt's new paper includes a very practical discussion (with diagrams and illustrations) of the technique of localization of the retinal hole and of the remedial ignipuncture. Gonin's technique was outlined by Gradle in the paper above referred to. Experience has shown that the natural tendency of the operator is to place the puncture farther forward than the hole, and allowance must be made for this fact, since it is more beneficial to err, if at all, in the opposite direction.

W. H. Crisp.

SOLAR RETINITIS

Next to the astronomer, the opthalmologist is perhaps most particularly affected by the phenomena of the eclipse of the sun. The fascination of observing a total eclipse is heightened to him, not only by knowledge of at least the elementary optical and mathematical problems involved, but also by his consciousness of the ocular lesions which may result if the eye of the observer be not properly protected.

The total eclipse of the sun on April twenty-eighth offered opthalmologists in San Francisco opportunity for both optical and pathological observations (since they were in the line of the ninety-nine percent obscuration). As the moment of the total phase approached, the sharply defined and ragged edge of the moon's disc contrasted strongly with the soft and uniform outline of the sun's limbus. Most striking were the shadow bands, presented as vague and rapidly moving wavelike alternations of light and shade flitting over any white surface illuminated by the sun's rays, immediately before and after the total phase. These are probably due to a flickering of the light from the thin crescent, produced by the undulations of the air in the same way as the twinkling of the stars. The rapid progressive motion sometimes assigned to them may be regarded as the natural result of an optical illusion. The hush that descended upon a large community, the deeper azure and violet tinge of all shadows, the progressive lowering of illumination, and the cold breeze which seemed to come in from all points of the compass, all contributed to give the sensation of a Power immense beyond human comprehension.

Late pathological effects of the eclipse were observed in five cases of "solar retinitis", which appeared for examination in the week following the eclipse. Of these, two have a small total central scotoma and are undoubtedly permanently injured. Two have a tantalizing small shadow before each eye, without our being able to prove a central scotoma. The fifth case was of a kind perhaps not yet reported, of definite central scotoma in an aviator who at the height of 12,000 feet, for a period of nearly an hour, observed the eclipse with great interest through a not sufficiently darkened glass.

It would seem to be the duty of ophthalmologists to warn their communities to use proper methods of shielding their eyes during observation of a solar eclipse. The darkened glass or x-ray film should be so dense that absolutely no sensation of disagreeable glare is experienced by the observer.

Hans Barkan.

CHEVALIER TAYLOR, OCULIST OR QUACK

A quack, says one dictionary, is "a boastful pretender to medical skill which he does not possess, a sham practitioner in medicine; a charlatan, an empiric". And a charlatan is "an assuming, empty pretender to knowledge or skill"; while an empiric, as here considered, is "one who begins to practice medicine without a regular professional education, relying solely upon his experience and observation".

Chevalier Taylor, the "royal oculist", was bitterly referred to by lexicogra-

pher Johnson as "the most ignorant man I ever knew"; a sally which provoked the Chevalier's grandson to speak of Johnson not altogether inaptly as "that literary hippopotamus".

In the minds of most readers of medical, and especially of ophthalmological history, Taylor is classified as a quack. But he was certainly not a quack in the full sense of the definition above quoted, and especially if reasonable allowance is made for the amplitude of medical knowledge which was normal in the eighteenth century. His father was a surgeon highly respected in the English town of Norwich, and his mother an apothecary, so that Taylor's early days were certainly passed in a medical atmosphere. For a short time he himself practiced in his father's home town, but he soon came into conflict with the other physicians of the place, and departed to seek his fortune elsewhere.

S. Wood, of the library of the Royal College of Surgeons of England, has added to numerous existing essays on this grotesque personality a most readable description of the life of Taylor (British Journal of Ophthalmology, volume fourteen, page 193). He concludes that "an estimate of Taylor's character which considers him as a quack would be inaccurate and unjust", and that "by virtue of a liberal education in general medicine and a special study of ophthalmology his practical work was probably equal to that of his contemporaries". "But he spoilt his record and brought discredit on the medical art by extravagantly advertising himself, by his lies, bombast, and duplicity".

He was certainly second to no quack of his own or any other time (and the England of the eighteenth century has been called the "paradise of quacks") in the art of blowing his own trumpet, or in resort to bombastic perorations. Addressing the students of the University of Oxford, he speaks of the eye as "that most amazing, that stupendous, that comprehending, that incomprehensible, that miraculous Organ . . . . the Proteus of the Passions, the herald of the Mind, the interpreter of the Heart, and the Window of the Soul"; and he closes his address as follows: "My Art, O ye Sons of Oxford, is the Ally of Heaven itself, and aids even the Almighty, obeying still the omnipotent Behest, Let there be Light".

Wood has given special attention to a manuscript, which has been for thirty-seven years in the library of the Royal College of Surgeons of England, and which he concludes is actually in Taylor's own handwriting. The manuscript is an account, written in French, of the ocular disorder of a "princess" of the imperial family of Russia, who was one of his distinguished patients.

Taylor's first book, "An account of the diseases of the eye", was published in 1727, when he was in his twenty-fourth year. In the preface to this book he complains that as soon as he had settled in Norwich a party was raised against him. The language in which he describes those physicians who conspired against him makes amusing reading, and no doubt served to increase the bitterness of the opposition: "These people are Dully grave, insipidly serene and carry all their Wisdom in their Mien . . . . An Awkward Saint-like Behaviour, a Solemn Gait, an Hypocritical Elevation of the Eye, and an Affected Religious Grimace, is sufficient to set a Man at the Head of his Profession. Their Pretence to Religion . . . . the Canting Custom of Asking a peculiar Blessing on every Thing they undertake, is because they know their Skill will stand very much in Need of it".

In the course of his career as an itinerant oculist he acquired many honorary foreign degrees which made an imposing array in his advertisements. He is said to have visited all the European sovereigns of any importance. In the "crisis of his grandeur" he travelled with two coaches and six black horses, and accompanied by ten servants in livery, beside gentlemen companions, all paid by himself. On arriving at a town he distributed a shower of leaflets. Preliminary notices in the press had set forth his works, degrees and honors, patrons, and testimonials. On the day

of his arrival in Amsterdam, in 1751, one hundred and seventy people sought his advice; while "at Rouen in 1743 it was necessary to have the door of his lodging guarded by soldiers because of the importunity of the people". In addition to his portfolio of testimonials, and a "wonderful array of instruments glittering with gold", he carried conviction to his clientele with one hundred and fifty to two hundred pictures of eye diseases painted on glass and copper. He claimed to treat the poor without charge, but promptly deserted them for his wealthier patients.

The Royal College of Physicians of Edinburgh warned the public that he made the sight of many worse promised to cure incurables, and was oppressive with fees; and in 1749 the medical men of Amsterdam sent to the newspapers a notice describing Taylor as a quack.

But he served ophthalmology by maintaining that this branch of medicine should be a specialty and that a thorough knowledge of the human system was necessary for its practice. He invented a cataract needle, was among the first to publish an illustration of conical cornea, was in advance of his time in his theory of the causation of squint, and may have anticipated Dieffenbach a hundred years in the performance of tenotomy.

However, Woods remarks that on reading his "Travels and adventures" one is left with a feeling of disgust that a man of his ability could be so childish. "Thus he loses the honourable place in history and the small measure of fame that his work would have ensured him, and instead, has become merely notorious". *W. H. Crisp.*

BOOK NOTICES

Ophthalmology, notes for students. By C. S. O'Brien, M.D., F.A.C.S., head of the department of ophthalmology, State University of Iowa. Flexible leather, octavo, 370 pages, illustrated. 1930.

This book has not been formally published, but has been printed for the use of the undergraduate students of the college of medicine of the University of Iowa. Its preface states: "For a more exhaustive study of eye diseases standard textbooks should be consulted". (Those of Rutherford, May, de Schweinitz, and Fuchs as translated by Duane are recommended.)

It might be thought that this was a rather large book for its purpose. But when it is known that 120 pages are given to illustrations the disproportion seems less. The illustrations are from outline drawings; and it is recommended that the book be taken to the class room, "and that the drawings be completed by the student during the lectures, or during the demonstration of cases in the clinics". Used in this way the book will become a record of the student's own observations, more serviceable for future reference than other books can be.

The printed text is a highly condensed, readable synopsis of what is found in most textbooks on ophthalmology. To a graduate in medicine it constitutes a valuable, definite outline of what there is to study about the eye and its diseases, either for the general practitioner who feels he needs to know more about ophthalmology or for one who desires to prepare himself for its special practice. For one who is already engaged in ophthalmic practice, this systematic synopsis of ophthalmology, as known today, can be a great help in the study that is necessary for any specialist who means to keep up with the current advances in his specialty.

The first thirteen chapters are devoted to the lids, lacrimal apparatus, orbit, eyeball, and the various parts of the eye itself. Each chapter begins with the anatomy of the part, then gives its examination, anomalies, diseases and injuries. Chapter fourteen is devoted to the optic paths and centers. Then come five chapters on refraction, extraocular muscles, eye complications in general diseases, symptom diagnosis, and therapeutics. In these chapters many experienced in ophthalmic practice will find valuable suggestions.

It is a pleasure to meet with a good

book, presented in such worthy form; and it is safe to predict there will be sale for other editions, when it is formally published. *Edward Jackson.*

Le Trachôme (Conjonctivite granuleuse). Morax, V., and Petit, P. J. 382 pages with six color plates. Jean Morax, 63 Rue Nollet, Paris, 1929. Price not stated.

This book is an important contribution to the literature of trachoma, and should be welcomed by all interested in this widespread disease. Morax and Petit undertook to write their monograph because no work of this kind was available in French. The authors have widely searched the literature on the subject, and references are found in footnotes, almost on every page.

The book begins with a detailed clinical account of the symptoms of trachoma. The authors contend that the ordinary descriptions found in the textbooks deal only with one aspect of the infection, and not even the most frequent, because in the countries where trachoma is widespread the majority of patients are attacked during the first years of life. The latent trachoma of infancy is usually discovered only when an infection with the Weeks bacillus or the gonococcus produces a secreting conjunctivitis and makes eye examination imperative. In this case, beside the acute symptoms, the increased thickness of the conjunctiva and the granulations show the latent trachomatous involvement. Morax and Lakah examined systematically all the infants placed with native nurses in an Egyptian institution in Alexandria, and found more than half of those under one year of age already infected. There were, however, no external symptoms of the disease, and it was only by everting the upper lid that the trachoma follicles could be found.

Methodical examination of school children in the same country showed also that a great number were affected with latent trachoma. Only about thirty percent of these will present later palpebral or corneal complications; the remainder will recover spontaneously, but keeping always as permanent marks of the infection slight cicatricial striæ or spots on the tarsal conjunctiva, sometimes visible only with the loupe. According to Meyerhoff, twenty or thirty percent of the trachomatous in Egypt recover spontaneously. In adults the period of incubation, found by experimental inoculations in man, varies from seven to ten days. Morax and Petit claim that there is no such disease as acute trachoma. What has been described as such is only a secondary infection with the Weeks bacillus or the gonococcus.

The complete cure of trachoma in a given patient cannot be asserted simply by the existence of scars in the tarsal conjunctiva. Sometimes a new attack with pannus and symptoms of irritation occurs.

An interesting chapter of the book is the one dealing with biomicroscopic examination of the conjunctiva and of the cornea in trachomatous patients. Vital staining with brilliant blue cresyl (made by W. Hoffmann) has shown that in the conjunctiva the mucous droplets are increased, even when the eye is not irritated. The epithelial cells, isolated or in groups, take an intense bluish coloration which proves they are dead and in the course of exfoliation. These cells are always more numerous in trachoma than in any other form of conjunctivitis. In old trachomas these stained cells form dull patches. These are lesions of xerosis, better recognized with Biebrich scarlet red, which colors the patches red.

In the cornea the biomicroscope shows two kinds of lesions: (1) the development of a network of vessels on the surface of the corneal stroma or even in the epithelium; (2) the appearance of small gray opacities immediately underneath the newly formed vessels and in their meshes, and also in the transparent cornea beyond. Two excellent colored drawings of pannus illustrate this chapter. They are far superior to the colored photographs representing the ordinary types with granulations in the tarsal conjunctiva.

In the section on diagnosis Morax and Petit show the characteristic differences between trachoma and swimming pool conjunctivitis, vernal catarrh, inclusion-cell conjunctivitis, folliculosis, tuberculosis of the conjunctiva, syphilis, and so on. The chapter on treatment is quite extensive and deals with the chemical, physical, mechanical, and biological methods, and finally with the surgery of trachoma. It would be impossible in a review to discuss the results of new methods of treatment. Those persons interested will do well to consult this book for complete details.

Morax and Petit are not enthusiastic about the Kuhnt-Heisrath method of excision of the tarsus, which has been used so much in America with gratifying success, especially in advanced cases with pannus. Their description of this method is quite brief and incomplete.

The section dealing with the pathology of trachoma is complete and interesting. Dr. Morax, himself a pathologist, gives very clear descriptions of the changes in conjunctiva, cornea, lacrimal glands, and tarsus. He studies the significance of Prowazek inclusions. It is important to mention the authors' opinion that the trachoma follicle is not the characteristic or specific reaction to trachomatous infection. They believe that the subepithelial and adenoid infiltration is the principal lesion, and that it is probably there that the unknown parasite of trachoma first develops.

Morax and Petit give a complete history of all attempts made to inoculate trachoma from man to monkey, from monkey to monkey, and from man to man. The methods used by Noguchi to isolate and cultivate the bacterium granulosis are fully reported. The authors summarize the researches of Rowland P. Wilson, who in Egypt in 1928 found the bacterium granulosis in some trachomatous patients, isolated it, and made inoculations in four monkeys. Three of the monkeys had a typical follicular conjunctivitis, and two a "development of follicles", but Wilson stated that this follicular conjunctivitis did not differ from that observed in noninoculated animals, and he does not believe that bacterium granulosis is the cause of this follicular conjunctivitis.

Morax and Petit have also made experiments with cultures of the same bacterium obtained from the Rockefeller Institute. They contend that the bacterium is not Gram-negative, as stated by Noguchi, but on the contrary is gram-positive, Noguchi's results being due to prolonged action of the solution used. The bacterium has been directly inoculated by Weiss, of Tunis, to four men free from trachoma, with negative results. Morax concludes that bacterium granulosis is not the specific agent of trachoma.

Later chapters include a complete history of the disease an extensive chapter dealing with the geographical distribution of trachoma, a study of prophylaxis and sanitary legislation in regard to trachoma in several countries, a discussion of the workman's-compensation law in France regarding the appearance of trachoma after trauma, and also of the propaganda against trachoma in the schools of the French colonies. *M. Uribe Troncoso.*

Pacific Coast Oto-Ophthalmological Society, transactions of the seventeenth annual meeting, Salt Lake City, Utah, July 1 and 2, 1929. Paper covers, 193 pages, illustrated.

This volume of transactions carries as frontispiece a group portrait of those attending the meeting. The papers presented are printed with a full report of discussions. Besides the president's address, there are three papers by guests and seven by members of the society. The subjects and authors are as follows: George Piness and Hyman Miller, "Nonspecific protein tissue reactions in eye, ear, nose, and throat practice"; Sanford Gifford, "Some notes on proteins as they apply to ophthalmology and oto-rhino-laryngology"; Hans Lisser, "Recent endocrinology"; Edgar Thomson, "Optic nerve

in sinus disease"; Clifford Walker, "Optic nerve in lesions of the sellar region"; Harry V. Würdemann, "Optic nerve in remote lesions"; Arthur Proetz, "Physiology and physics of nasal sinuses"; Frank Kistner, "Pathology of sinusitis"; E. Sewall, "General principles of treatment of nasal sinuses (surgical)"; E. R. Lewis, "General principles of treatment of nasal sinuses (nonsurgical)". The volume also includes the minutes of the business meeting of the society; the constitution and by-laws; and a list of members with their addresses. Supplementing the previous action of the society in requiring new members to possess the certificate of one or other of the national examining boards, an amendment was adopted to the effect that junior membership in the society should be granted to men not yet in possession of such a certificate, but that, in case of failure to take the examination for such a certificate within two years of the date of application for junior membership, such junior membership should automatically cease. The society will hold its next meeting in Victoria, British Columbia, under the presidency of Dr. Arthur C. Jones (of Boise, Idaho). Dr. Walter F. Hoffman of Seattle continues as secretary-treasurer. *W. H. Crisp.*

CORRESPONDENCE

Alleged blinding of Greek children

Dr. Morris Fishbein, editor of the Journal of the American Medical Association, has been in correspondence with the Minister of Greece at Washington as to a statement issued by the Associated Press some months ago concerning the alleged blinding of "forty children" by mistaken administration of a certain drug. Dr. Fishbein has been kind enough to send to the editor of the American Journal of Ophthalmology the following copy of a letter recently received from the Minister of Greece:

Dear Sir:

Referring to my letter of April 12, 1930, I beg to inform you that the report concerning the blinding of forty children was incorrect.

In the sanitary station of Kessariani, near Athens, a great number of children were being treated for acute ophthalmia with pus secretion which occurs usually in the fall. Eight of these children presented themselves with a very severe attack of this disease accompanied with complications due to the unhealthy conditions under which they lived in their homes. Owing to the acuteness of the disease, the sight of these eight children was badly impaired.

The alleged blinding of a great number of children is incorrect and does not correspond with the truth.

I am,

Very truly yours

(Signed) *Ch. Simopoulos,*
Minister of Greece

OBITUARY

John Scott Wood

Dr. John H. Ohly writes:

John Scott Wood, one of the leading ophthalmologists of Brooklyn, died of heart disease at his home, 172 Sixth Avenue, Brooklyn, on April 7, 1930. Dr. Wood was born in Frankfort, Kentucky, on September 1, 1863, a descendant of an old American family. His great grandfather, James Wood, came to America in 1719, settled in Indiana, and later moved to Kentucky.

Dr. Wood's early education was obtained in private schools in his native town. He attended Georgetown College for several years, and studied medicine at Bellevue Hospital medical college in New York City, graduating in the class of 1886. He served three years internship at Bellevue Hospital, Gouverneur Hospital, and the Brooklyn Hospital.

He entered into private general practice in Brooklyn in 1889 and after several years specialized in Ophthalmology. He became a surgeon at the Brooklyn Eye and Ear Hospital in that year, being associated with Dr. Lenox. He also served as attending ophthalmologist at King's County Hospital,

the Methodist Episcopal and the Norwegian Hospital. He was an excellent clinician and gave freely of his time to the various hospitals; and was well beloved by his many patients.

He was a member of the American Medical Association and of local, county, and state medical societies. He became a member of the American Ophthalmological Society in 1906. He was also a member of the Brooklyn Ophthalmological Society.

He was married February 1, 1893 to Elizabeth Barrow. Four sons were born to them all of whom survive.

Dr. Wood had been in poor health for the past six or seven years and had been gradually retiring from his large private practice.

In his younger days he was an ardent student and kept well abreast with the advances in medicine. He was a most kind and courteous gentleman, a man of positive opinions with a firm and strong character. He will be greatly missed by his medical associates, among whom, by reason of his rare personal charm, he had many ardent admirers and friends.

ABSTRACT DEPARTMENT

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1 General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education and history

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1. GENERAL METHODS OF DIAGNOSIS

Evans, John N. **An interpretation of defects in the visual field.** Arch. of Ophth., 1930, v. 3. Feb., pp. 153-175.

The author uses three divisions: (1) recent knowledge concerning the retinal perivascular lymph space system, (2) related material concerning the anatomy and physiology of the blood vessels, (3) evidence derived from the study of angioscotomata.

A considerable number of workers have reported similar studies, with varying conclusions concerning the first of these. The technique followed by the author was that of Wagefarth, who injected a slightly hypertonic solution of equal parts of potassium ferrocyanide and iron ammonium citrate into the vitreous, and after fifteen minutes killed the animal by bleeding, and found the precipitated Prussian blue particles when the tissue was hardened in an acid solution of formaldehyde. Large and small vessels were easily delimited. The particles were never in the vessels, nor could it be stated that they lay in a formed space about the vessels. They were also found about the bipolar cells and their fibers and about the ganglion cells.

In Evans' work, with all the physiological and pathological changes the angioscotoma showed widening, as would be expected. Impending attacks of glaucoma have shown increase of the angioscotoma as a very delicate and early sign.

It requires about two hours to map the entire field for the angioscotomata, but in suspected disturbances only that part of the field likely to be involved need be studied. Such mapping is also of value in the presence of scotoma due to nerve fiber disturbances, as a few vessel stumps properly outlined about such a field defect give evidence that the scotoma has been properly outlined.

Over six hundred cases have thus been studied by the author, many with as high as thirty observations. From this work he feels that it is justifiable to accept the perivascular lymph system in its relations to angioscotometry as a foundation on which to base the interpretation of a certain class of defects of the central part of the visual field. *M. H. Post.*

Schmelzer, Hans. **The significance of blood sedimentation time in ophthalmology.** Zeit. f. Augenh., 1930, v. 70, Jan., p. 149.

The author presents in detail his studies of this phenomenon in many patients suffering from a great variety of

ocular affections. He is forced to conclude that the test is of no differential diagnostic value. On the other hand it may aid in the prognosis as to healing, if it is followed in certain afebrile diseases. *F. H. Haessler.*

Scotti, Pietro. **Various methods of pupillary measurement.** Ann. di Ottal., 1929, v. 57, Oct.-Dec., p. 886.

Two general methods of pupillary measurement are recognized, the objective and the subjective. The former may be by comparison, by projection, by photography. That by comparison may be direct, tangential, or by transparency. Each of these is considered elaborately in detail. For common use the comparative method of Haab and the tangential apparatus of Schlösser are adequate. For more exact results the projection method of Krassius, of Ohm, or more specially of Magniani is preferred. The photographic method is suitable only for the laboratory. Entoptic measurements require a certain amount of intelligence on the part of the one examined. It is not clinically applicable and is mentioned only because of its reference to the laws of physiologic optics. *Park Lewis.*

2. THERAPEUTICS AND OPERATIONS

Braun, G. **The treatment of eye conditions with radiotherapy.** Med. Klin., 1929, v. 25 Dec., p. 1926.

The history of the use of light rays in the treatment of diseases of eye is given, including ultrared and ultraviolet rays; with a general survey including the use of roentgen rays in the treatment of tumors as well as inflammatory conditions. The author reports favorable effects from roentgen rays in tuberculosis scleritis.

Beulah Cushman.

Caso, G. **Insulin in ocular lesions.** Ann. di Ottal., 1930, v. 58, Jan.-Feb., p. 148

The use of insulin is to be recommended in ocular lesions in the diabetic, for in certain conditions it may be of benefit. It is especially useful in improving the general physical condition before cataract operations, thereby preventing postoperative complications.

When used with caution, insulin does not increase the intraocular tension in a glaucomatous eye with fundus lesions. Even if it does not cure the eye disease it betters the physical condition and raises the morale of the diabetic sufferer. (Bibliography.)

Park Lewis.

Feuillié, Émile. **Autophylactic therapy in ophthalmology.** Bull. Soc. Franç. d'Opht., 1929, p. 197.

Feuillié advocates the use in infections of autophylactic therapy, which is designed to increase the natural defenses of the body and to act irrespective of the type of invading microbe. The therapy is conducted along five lines: (1) to promote leucocytic renewal by intramuscular injections of agents such as mercury or bismuth; (2) to modify acute inflammations by injections of colloidal silver; (3) to stimulate leucocytic action by opotherapy, particularly with thyroid extract; (4) to promote intestinal elimination; (5) to consolidate the metallic structures of the body cells, particularly of the leucocytes, by calcifying medications such as irradiated ergosterol. Good results are reported in both acute and chronic infections.

Phillips Thygeson.

Gnad, Franz. **The action of pupillomotor drugs after locally circumscribed application.** Klin. M. f. Augenh., 1930, v. 84, April, pp. 510-516. (2 ill.)

In persons of both sexes and different ages, and with normal and pathological pupillary reactions and different color of iris, the conjunctiva was anesthetized by instillation of diocaine (0.3 percent) and the eyes held open by a speculum or by an assistant, so that a small pellet of cotton moistened by the drug could be laid on a definite part of the conjunctiva near the limbus. Of mydriatics, atropin, homatropin, cocaine, levoglaucosan, and subconjunctival cocaine-adrenalin were used, of miotics eserin and pilocarpin. The pupil reacted with

local change of shape, and gradually returned to its normal roundness. Form, extent and course of the phenomenon are dependent upon the kind of drug, duration and other technique of application, the color and general ability of reaction of the iris, and the age of the individual. A blue iris reacts to a 0.5 percent solution of atropin, whereas a brown iris requires a one percent solution. Similar observations were made with cocaine. There seems hardly any doubt that the lesser reaction must be ascribed to the greater amount of mesodermal tissue in dark irides. The author considers only supraconjunctival application of levoglaucosan of practical value. He warns against subconjunctival injection of cocaine-adrenalin at the site of operations on the anterior chamber which leave the iris intact. *C. Zimmermann.*

Kleefeld, M. G. **Irradiated ergosterin in oily solution instilled into conjunctival cul-de-sac.** Bull. Soc. Belge d'Opht., 1929, no. 59, p. 76.

The author has used for more than a year a pommade of cod-liver oil, vaseline, lanolin, kaolin, and oxide of zinc which he says has shown remarkable keratoplastic properties. Clinical tests were made to determine what effect vitamin D in oily solution might have when placéd in contact with the eyeball. Hence the experiments with irradiated ergosterin, which by the way, is a near chemical relative of cholesterin. The activity of the vitamins depends on their conservation, and it would seem illusory to activate salves with ultraviolet radiation in order to obtain the effect of vitamin D.

J. B. Thomas.

Kleefeld, M. G. **Local ocular insulin therapy. Corneal ulcer in dogs.** Bull. Soc. Belge d'Opht., 1929, no. 59, p. 80.

The author first reported on this subject in 1928. His experience in hundreds of cases proves that insulin may be placed in the conjunctival cul-de-sac in the form of a salve containing five clinical units to ten c.c. of oily base without any danger generally or locally. Several cases of zona ophthalmica with favorable results are reported. One must use a cholesterinized excipient for insulin in corneal ulcers. The salve should be placed in the cul-de-sac and the patient should hold his eye open for several moments. The conclusions are: (1) Insulin has a local therapeutic action on the eye: it should be used as an adjuvant to the usual treatment. (2) This action is usually manifest in the eye of the dog, and this animal lends itself well to the study of ocular medication. (3) the insulin should be incorporated in a salve of hygroscopic power; hence the cholesterinized excipient recommended by Professor Coppez is advisable. (4) It is not certain whether the growth-promoting agent is insulin itself or impurities incident to the manufacture of the product.

J. B. Thomas.

Salvati, G. **Treatment of strabismus by alcohol injection.** Ann. d'Ocul., 1930, v. 167, March, pp. 229-233.

Injection of alcohol along the course of an overacting muscle which has caused strabismus is advocated to produce a paresis of this muscle. This is offered as a substitute for tenotomy, the advantage being the simplicity of the operation and the absence of retraction of the caruncle postoperatively.

Lawrence T. Post.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Fick, A. E. **The origin of the contact glass.** Münch. med. Woch., 1930, v. 77, March, p. 495.

In 1887 the author asked Professor Abbé, at that time director of the firm of Zeiss, to grind for him a glass with a corneal curve of eight mm. and a scleral curve of twelve mm. He received four such glasses with which he conducted his experiments reported in the Archiv für Augenheilkunde in 1888. A year later he learned to his surprise that what were delivered to him were not ground but skillfully blown glasses. At the same time appeared Mueller's dissertation on "corneal lenses", which Mueller had had ground by another

optical firm. At first they were composed of a corneal and a scleral portion fused together, later on they were ground of one piece. The author, while giving Heine credit for the amplified uses the contact glass, protests against Heine being given credit for "inventing" the contact glass. *M. Davidson.*

Heine, L. **Correction of various ametropias by means of ground contact glasses.** Münch. med. Woch., 1930, v. 77, Feb. 14, p. 271.

This is a continuation of the previous paper on this subject by the same author (see American Journal of Ophthalmology, 1930, May, page 450.) Ten illustrative cases are given, showing in some cases moderate and in some cases a considerable improvement of vision with the contact glass. The most marked improvement was obtained in a case of aphakia complicated with tarsal deformity due to xeroderma pigmentosum and pannus, vision being improved from 6/36 to 6/12 and the pannus becoming absorbed.

M. Davidson.

Hudelo, A. **The mechanism of accommodation and diabetic myopia.** Arch. d'Opht., 1930, v. 46, Feb., p. 70.

The writer does not consider the present explanations of refractive changes in diabetes as being satisfactory. A theory of accommodation is advanced in which the ciliary muscle is considered as being physiologically, as well as anatomically divided. The circular fibers are considered as antagonists to the meridional fibers. Contraction of the circular fibers causes a relaxation of the zonule with resulting accommodation for near. Contraction of the meridional fibers tenses the capsule and focuses the eye for distance. It is assumed that the tensive power of the meridional fibers is equal to about three diopters so that a paresis of this portion of the muscle would produce a myopia of about that amount. Paralysis of the circular fibers would cause a thinning of the lens and an increased hypermetropia. Paralysis of both muscles would cause no change in refraction but a loss in accommodation. This theory can explain both the hypermetropia and myopia found in diabetes by assuming that different portions of the muscle become paralyzed in the two conditions. *M. F. Weymann.*

Lo Cascio, G. **Modern views on the sensory mechanism of vision.** Ann. di Ottal., 1930, v. 58, Feb., p. 107.

This is an introductory lecture. Vision may be considered as the resultant of the succession of four elementary phenomena, one exclusively physical, one dioptrical or sensory, one of conduction, and one wholly psychical or that of perception. Each is considered historically and in detail. It cannot yet be affirmed with certainty that the primary seat of the transference of luminous energy is either in the rods or cones, or in the pigmented epithelial elements of the retina. Accepting the modern conception of the nature of light as the breaking up of the atom, we may conclude that luminous energy is the resultant of the limitation of the electronic orbits interfering with the chemicophysical balance in the light-sensitive elements in the retina, and the sensation of sight is the result of their interrupted equilibrium.

The physiology of sight has made great progress during the present century and, while it is true that up to this time no theory yet proposed can be accepted without further discussion, the tendency of science is toward the electrochemical interpretation of the sensory mechanism of vision.

Park Lewis.

Miles, Walter. **Neon glow lamps and the demonstration of visual phenomena.** In "Short articles and notes", from Jour. of Gen. Psychology, 1929, v. 2, pp. 545 to 551.

For advertising purposes and as an adjunct for laboratory experiments the neon lamp has many advantages. It provides flashes of light at a rate governed by the cycle frequency of the current used. It will respond to rates as high as 50,000 per second and is nearly instantaneous in its rise to com-

plete brilliancy and in its decline to zero. Due to the persistence of vision, flashes of light appear when the lamp is moved or when the eyes are moved. These flashes are very obvious and challenging as a new and unexpected feature in the environment, therefore they are quite attention-compelling. It is thus unnecessary to "flicker" the street sign made from this type of lamp. Neon light is not too strong for direct vision. A small electrode of this character may be visually fixated without discomfort to the eyes. Used as a control to insure steady fixation in visual experiments this lamp aids the observer in reporting his fixation failures. By arranging fixation points around a stationary neon lamp the approximate rate and directness of saccadic eye movements can be observed (counting flashes) by alternating fixation between the points and thus examining horizontal and vertical axes of movement. The adequacy of pursuit movements in reference to the speed of a target (in this case the lamp) can be observed. If the pursuit movement has to be supplemented by a saccadic movement, flashes appear. Similarly, compensatory eye movements associated with head movements and body movements can be studied.

(Three figures illustrate the paper. References.) *George H. Stine.*

Miles, Walter. **One hundred cases of color blindness detected with the Ishihara test.** In "Short articles and notes", Jour. of Gen. Psychology, 1929, v. 2, pp. 535 to 543.

In a group of 1286 university men examined by means of the Ishihara test during 1927 and 1928, it was discovered that 106 exhibited definite color defect. This percentage, 8.2, is about double that ordinarily found with wool tests for color blindness. A group of 436 university women showed one clear case and three other faint cases of color blindness. Among the men green-blindness is more frequent than red-blindness in the ratio of about 3 to 1. In a large number of the cases of color blindness, the men are quite unaware that such a defect is present. The Ishihara test constitutes the simplest available demonstration for convincing such cases. A few cases detected by this test show better ability to read the numbers at a distance of ten feet than at four feet, thus indicating greatly restricted color fields, which are practically confined to the fovea.

The Ishihara test, which consists of numbers two inches high printed in colored dots on fields of colored dots, is recommended as a practical test of color blindness to use in combination with routine physical examinations and by ophthalmologists. This test is very serviceable in selecting cases of color-vision defect for further study.

(Three tables). *George H. Stine.*

Miles, Walter. **The vehicle illusion in the vertical axis.** In "Short articles and notes", from Jour. of Gen. Psychology, 1929, v. 2, pp. 543 to 544.

The vehicle illusion is a very common one, especially in the horizontal axis. However, Miles is not aware that anyone has reported this illusion occurring in the vertical axis. He reports a very compelling vehicle illusion in the vertical, occurring at a railroad ferry. Brief experience of this illusion in the vertical axis can be got from automobile and passenger elevators. However, the speed of elevator movement commonly used introduces a visceral-kinesthetic factor which serves to cut short the illusion.

The author concludes that the vehicle illusion can occur in the vertical axis if conditions are present similar to those that produce it in the horizontal. It appears to be an illusion that is quite independent of axis of motion but wholly dependent upon a certain range of speed, the involvement of a certain amount of visual field, and the absence of certain kinesthetic factors.

George H. Stine.

Nicolato, A. **On the etiology of myopia.** Arch. di Ottal., 1929, v. 36, Nov., p. 453.

The author, after considering various

myopiogenic theories, emphasizes the contentions (a) that there must be a common cause as predisposing factor in all myopes; (b) that this factor is an endocrine dysfunction, resulting in hormone disturbance, which affects the nutrition of the organ; (c) that these endocrine alterations are hereditary, and are sometimes complicated by various diatheses; (d) that the resulting myopia may be benign or pernicious, and (e) that the predisposing cause in all myopes is a thymic dysfunction. *David Alperin.*

Odeneal, T. H. **A new astigmatic chart.** Arch. of Ophth., 1930, v. 3, Feb., pp. 148-150.

A new astigmatic chart is described and illustrated. On a circular dial which can be rotated about a central axis, two lines 1/32 inch in diameter are drawn at right angles to one another. In the center a small square is drawn with lines 1/64 inch in diameter. The vision is fogged to 20/60. This dial is then used in the usual way and great accuracy is claimed by the author. *M. H. Post.*

Parsons, John. **Color vision and its anomalies.** Brit. Jour. Ophth., 1930, v. 14, March, p. 97.

Color, like all forms of perception, is the ultimate result of physiological impulses set up by physical stimuli. The investigation of color vision, therefore, demands a somewhat advanced knowledge of physics, physiology, and psychology.

It is obvious that the investigation of the problem can be approached from two sides. We can alter the physical stimuli in various ways and can study the psychological results, a method which may be called the synthetic method; or we can take the psychological facts as data and attempt to analyze them, the analytical method. Both have been exhaustively pursued; but, as might be expected, more fruitful results have been obtained from the former than from the latter.

The essayist discusses color as observed in the visible spectrum, and the results obtained by mixed colors. In nature most colors are mixed colors. The application of the investigations to practical things in life in relation to color-blind people is of considerable importance. While wools afford valuable information, the use of a lantern is perhaps more efficient. The human eye is not a precise physical instrument, but is highly complex and variable. It is subject to great variation from individual to individual and from moment to moment, and is subject to adaptation to variations of light stimulation. Hence the great difficulty in devising a truly efficient system of testing. *D. F. Harbridge.*

Quidor, A. and Hérubel, Marcel. **The visual perceptions.** Ann. d'Ocul., 1930, v. 167, March, pp. 185-191.

The article presents further proof of the proposition advanced by these authors in 1909 that the sensation of relief seen with the stereoscope was not due to the geometric reconstruction of the objects represented but to the psychic fusion of their conjoined images. They believe that their experiments indicate that the sensation of relief is independent of the phenomenon of convergence.

Lawrence T. Post.

Quidor, A., and Hérubel, M. **Notation and projection of color and of relief.** Ann. d'Ocul., 1930, v. 167, March, pp. 191-205.

This is a continuation of the subject discussed in the preceding paper.

Lawrence T. Post.

Waardenburg, P. J. **Combination of total color blindness and atrophy of the retina in one person, with communications on congenital achromatopsia and macular yellow.** Klin. M. f. Augenh., 1930, v. 84, April, pp. 493-509. (7 ill.)

A girl aged six years showed total color blindness, photophobia, vertical nystagmus hypermetropia of four diopters, narrow retinal vessels, pinkish disc with slightly veiled borders, irregular

peripheral pigment deposits, normal macular region. At reexamination after eight years vision was 1.5/60. Hemeralopia, nyctalopia, posterior cortical opacities, retinitis pigmentosa, patches of choroidal atrophy, dots similar to retinitis punctata albescens, and concentric contraction of the visual fields were noted. The Wassermann reaction was negative. The girl had always been slightly deaf. The parents were not related by blood.

Description is given of seven cases of total color blindness which were examined in red-free light. Macular yellow was absent in two, diminished in two, insular or locally diminished in two, present in one. The normal foveal reflex was always missing. A dark red center of the fovea was observed in three children of the same family. Hence the author concludes that the macular conditions in achromatopsia are not always identical. The clinical picture of achromatopsia may be thus described; impaired vision, total color blindness, nyctalopia, nystagmus, sluggish dilatation of the pupil on darkening the room after light adaptation, more or less rudimentary development of the fovea and of the macular yellow. The following may also occur: photophobia, central scotoma, increased adaptation, maximum brightness in the green. Thus the achromatopsia takes a clinical position distinct from that of partial color-blindness.

C. Zimmermann.

4. OCULAR MOVEMENTS

Aurand, L. **New method of replacing the superior oblique muscle by advancement of a part of the external rectus and a part of the inferior or of the superior rectus.** Ann. d'Ocul., 1930, v. 167, March, pp. 213-226.

In case of paralysis of the superior oblique muscle, the external rectus is split longitudinally and the lower half advanced almost to the limbus and to a point midway between the insertions of the external and inferior recti. In similar fashion, the inferior rectus is split and one half advanced to a position adjacent to the advancement described above. The author claims this operation has proved more successful than any previously suggested.

Lawrence T. Post.

Bakly, M. A. **Postdiphtheric paralysis of accommodation.** Bull. Ophth. Soc. of Egypt, 1929, p. 92.

A Syrian boy of ten years was seen twenty-five days after an attack of diphtheria. For a week he had been unable to read his school books, and fluids regurgitated through the nose. Ten days later his speech could hardly be understood, and his legs were so weak he could not stand or walk alone. These symptoms improved, and in ten days more he was in good condition. Vision was reduced to 6/36, and he could not read no. 6 Jaeger type, the largest line. He was found to have hyperopia of 4 D. The optic disc looked hazy with outline undefined but no appreciable swelling; the retinal veins were engorged. The pupils were dilated but reacted to light, the extrinsic muscles were normal. Vision could not be improved by lenses, and the fields were slightly contracted. The urine showed moderate albumin, which disappeared in a week.

This boy had been given antitoxin daily, the fifth to eighth days of his attack, 12,000 units the first dose, and 28,000 altogether. Later he became normal, his vision improved to 6/6, and he could read fine type. Bakly points out that this case supports the view that diphtheric paralysis is peripheral, the toxin affecting the nerves locally in the main. The fundus changes were probably due to the toxins, as in other acute fevers. The kidney lesion may have been of similar character.

Edward Jackson.

Delganov, V. N. **Operations for strabismus.** Arch. Oftalmologii (Russian), 1930 ,v. 7 pt. 1, pp. 1-14.

The author discusses the various factors contributing toward efficient and safe strabismus surgery. Twenty-seven types of complications, from temporary diplopia to panophthalmitis, are enumerated, and their frequency, significance, and prevention are dis-

cussed. In the operative correction of strabismus, Delganov prefers a simultaneous shortening and advancement of the weaker muscle. Instead of resecting the anterior part of the muscle, he folds and places it underneath the muscle belly. In his opinion this procedure increases the effect of the operation. *M. Beigelman.*

Di Marzio, Q. **Ocular paralyses consecutive to rachianesthesia and rachicentesis.** Riv. Oto-Neuro-Oft., 1930, v. 7, Jan.-Feb., pp. 1-19.

The author reports five cases of unilateral paralysis of the right external rectus and two cases of bilateral paralysis of the same muscle. Two of the unilateral cases manifested themselves after a diagnostic spinal puncture, all other ones after spinal anesthesia for which two percent and four percent solutions of novocaine had been used. The paralysis manifested itself from in five to sixteen days after the operation; three of the cases recovered entirely after proper treatment while two showed marked improvement when last seen. The toxic and the chemical theories are to be excluded as pathogenic factors of this paralysis, for it can follow a simple spinal puncture in which no anesthetic has been injected.

The patients showed all the symptoms of a serous meningitis, the increased intracranial pressure apparently being the cause of the paralysis. Some patients, in fact, show other evidence of the increased intracranial pressure, such as papilledema, headaches, dizziness and vomiting. The hyperalbuminosis, the hyperglucosis and the hyperleukocytosis of the cerebrospinal fluid are symptoms of an aseptic meningeal reaction.

The sixth cranial nerve is especially affected because of its small size, its long intracranial course, and the exceptionally small opening of the dura which gives passage to it. Temporary paralysis is, then, a result of the hypertension of the cerebrospinal fluid, while the persistent and recurrent paralysis consecutive to spinal puncture is to be considered as a symptom of preexisting tabes, multiple sclerosis, hypophyseal tumors or/and Basedow's disease. (Bibliography.) *Melchiore Lombardo.*

Fischer, E. M. **Binocular field of vision in concomitant squint.** Russkii Oft. Jour., 1930, Mar., pp. 314-320.

The following method has been selected by the author for the study of binocular visual fields in concomitant squint. The patient's head is adjusted on a perimeter as for examination of the squint angle; one eye is covered with a red glass plate; a candle light is moved along the arc of the perimeter, and its appearance in red, rose, and usual colors is registered. In divergent squint the deviated eye participates in the formation of a binocular visual field by enlarging the extent of peripheral vision. In convergent strabismus the squinting eye offers an improved vision along its visual axis. This, however, is of no practical value because of the strong suppressive tendencies in the squinting eye. *M. Beigelman.*

Miles, W. R., and Bell, H. M. **Eye-movement records in the investigation of study habits.** Jour. of Experimental Psychology, 1929, v. 12, Oct.

Photographic records of the eye movements of sixteen advanced university students were taken when they were reading a paragraph from form T of the Thorndike intelligence examination for high school graduates, part 3. Comparisons were made between the average perception-time per line, the average Thorndike test score, and the average number of lines read in rapid reading practice-periods. The average number of pauses per line of 67 mm. length (7 words) was 5.9 (range 4 to 7), the average duration of pause was 0.26 sec. (range 0.21 to 0.32), and the interfixation span covered 1.3 words (range 1.0 to 1.7). Readers vary more in the number than in the duration of pauses. The average perception-time per line of reading material (difficult prose in long sentences) was 1.53 sec. As judged by number of fixations and freedom from regressives, the majority of the readers covered the material at

the left end of the lines more thoroughly than they did that at the right. Regressive fixations occurred at the middle or right end of the line more frequently than at the extreme left. The slow readers tend to extend their fixations to the very ends of the lines, but the rapid readers do not. Unfamiliar words and the beginnings of sentences have relatively more fixations of a long duration. The most rapid readers as a rule show the most extensive perception spans. There is a comparatively high correlation (about 0.70) between perception-time per line and scores on the Thorndike test; and this correlation was found to be a serviceable measure of studying ability. The rate of reading varies widely with the type of material and the purpose of the moment, and the unanalyzed gross rate cannot be taken as representing the student's studying ability. By using three or more measures of studying ability, for example, the Thorndike test scores, the number of lines read in rapid reading practice, and the results from eye movement recording, it is possible to make a practical diagnosis of the studying ability of university students and to formulate constructive suggestions for individual cases.

(Two tables are appended.)

George H. Stine.

Miles, W. R., and Segel D. **Clinical observation of eye movements in the rating of reading ability.** Jour. of Educational Psychology, 1929, Oct.

The authors examined a class of fifty-nine unselected grade three students. The clinical method, termed the "peep-hole method," consisting in observing from the center of the page which is read, was used. The examiner places his eye behind a small opening at the middle of the page of material and holds the page in front of the subject's eye. He can therefore directly see the position of the line of sight, fixations, head movements, and lip movements.

The best of the readers showed fixation durations which corresponded closely to findings for adults. They made practically no regressive movements, showed hardly any confusion intervals, made little or no head movement or lip movement. The very poor grade three readers required ten-fold as much time to cover the same material, used twice as many fixations, made many regressive fixations, and conspicuously showed head movements and lip movements.

A correlation of about 0.70 ± 0.05 was found between the clinical results and results got with the Gates reading tests and by teachers' ratings. The clinical results have the advantage over the tests and over teachers' rating results, being more analytical in that they show the motor habit side of the difficulty which we call poor reading ability. From such clinical observations the authors feel that they can easily determine whether the child thoroughly knows how to read. (One figure and a table of the reading results are given.) *George H. Stine.*

5. CONJUNCTIVA

Aust, O. **Contribution to trachoma research (inclusion infection, inclusion blennorrhea, swimming-pool conjunctivitis, and their relation to each other).** Graefe's Arch., 1929, v. 123, p. 93.

The author reviews seventeen cases of acute conjunctival inflammation with positive inclusion findings in adults. In the beginning all these cases appeared like acute granulomatous trachoma. In none of the cases did scarring in the conjunctiva occur. The author has gained the impression that the acute beginning associated with the finding of many inclusions almost always indicates an infection from a genital source. At least he has not so far seen a case of acute trachoma which later showed cicatricial changes.

Inclusion disease of the genitals cannot be clinically recognized, and its presence in fresh cases is demonstrated with considerable difficulty in the epithelium of the genital tract; the only practical method of proving its genital existence is by means of animals.

Mixed infections in the new-born, of inclusion blennorrhea with gonococci,

have been known since 1909. In the majority of these cases gonococci are found at a time when the inclusion blennorhea has not as yet started, on account of its longer incubation period. The cell inclusions are usually discovered for the first time in subsequent examinations, when the possibility of a mixed infection is considered likely because of the especially intense progress of the disease. These mixed infections in the new-born can only be explained by simultaneous presence of both infecting agents in the mother's genitals.

Cell inclusions were found in four among thirty-one cases of swimming-pool conjunctivitis that were thoroughly examined. Series of typical early cases showed no cell inclusions. Clinically the only difference between the inclusion-positive and inclusion-negative cases was that the average duration of the inflammation in the former was ten to thirteen months and in the latter four to six weeks. Swimming-pool conjunctivitis is never followed by cicatrization in the conjunctiva. The great variation in the length of its clinical course indicates little uniformity in the etiology of swimming-pool conjunctivitis. It is probably caused by various infective agents. Those cases of swimming-pool conjunctivitis having cell inclusions, unlike those without cell inclusions, show clinically and microscopically so complete a correspondence with inclusion infection of adults that they can be classed with the inclusion infections from a genital source. The remaining cases must be caused by some infective agent differing from that in the cases with cell inclusion. *H. D. Lamb.*

Boen-Lian, Sie. **Phlyctenules in catarrhal conjunctivitis, their histological structure and their relations to scrofulosis or tuberculosis.** Klin. M. f. Augenh., 1930, v. 84, March, pp. 360-372. (4 ill.)

In the Dutch East Indies phlyctenules are frequent, in connection with catarrhal conjunctivitis and trachoma, but not with scrofulosis or tuberculosis. Among three thousand patients of the eye clinic at Djogjakarta more than two hundred cases of phlyctenulosis were treated, while only two cases of scrofulous phlyctenular affections were observed. Five clinical histories of catarrhal conjunctivitis and trachoma, without any signs of tuberculosis, are reported with histological examination of the phlyctenules. These consisted of accumulations of polynuclear leucocytes, characteristic of intense inflammation, with formation of vesicles in the epithelium, filled with serous exudate, between the basal and upper layers. The vesicles burst within a short time, so that only the basal layer covers the phlyctenule, and if this sloughs an ulcer results. The stage of repair is characterized by new formation of connective tissue and epithelium within from three to four days. The phlyctenules heal without leaving any traces. It seems that the phlyctenules are a product of a merely local agent, the same which causes catarrhal conjunctivitis. *C. Zimmermann.*

Cuénod and Nataf, R. **Biomicroscopy of the tarsal conjunctiva in trachoma.** Bull. Soc. Franç, d'Opht., 1929, p. 220.

Cuénod and Nataf have made an extensive biomicroscopical study of the conjunctiva of the superior tarsus in all stages of trachoma. They conclude that this method reveals characteristic changes in the epithelium and blood vessels of the conjunctiva which are of definite importance. They also believe that the trachoma follicle presents an appearance under the slit-lamp which definitely distinguishes it from the various types of simple follicles. The value of this last observation in the diagnosis of the disease can be well understood when one considers that histologically the follicles are indistinguishable. *Phillips Thygeson.*

Di Fede, N. **Kleczkowski's seriodiagnostic method for differential diagnosis between traumatic and follicular conjunctivitis.** Arch. di Ottal., 1929, v. 36, Sept.-Oct., p. 384.

The author claims that the hemoly-

tic power of the serum of trachomatous patients is characteristic, and may be used where a differentiation between trachoma and follicular conjunctivitis is otherwise impossible.

David Alperin.

Guerra, P. **Spring catarrh (experimental researches on some forms).** Arch. di Ottal., 1929, v. 36, Sept.-Oct., p. 356. Continuation: see this Journal, 1930, May, p. 455.

The author rejects the theory of the allergic origin of this condition, and believes the vagotonic aspect of endocrine dysfunction to be the only rational theory. The pallor, hypotony, and other manifestations in spring catarrh point especially to a deficiency of suprarenal secretion.

David Alperin.

Jaeger, Ernst. **A hitherto undescribed affection of the conjunctiva.** Klin. M. f. Augenh., 1930, v. 84, March, pp. 373-380. (2 ill.)

During observation for three years the conjunctiva of the left eye of an otherwise healthy woman of twenty-five years showed three attacks of inflammation, the first in the lower lid, the second on the nasal portion of the ocular conjunctiva, the third in the nasal third of the upper lid and the upper fornix. Each commenced with stabbing pain, without objective symptoms. After two days came redness and swelling of the submucous tissue with intact epithelium, a few days later (in the lower lid a few weeks later) white discoloration of the inflamed area, with large epithelial defect and deep necrosis. The upper lid healed spontaneously with scars, the lower lid and ocular conjunctiva only after excision of the diseased tissue. Except a transient marginal corneal infiltration, the eyeball always remained intact. The pathological findings in excised tissue are described. The author assumes a local disturbance of metabolism of unknown cause. *C. Zimmermann.*

Loddoni, G. **Keratoconjunctival phlyctenulosis and allergy. (Clinical and experimental research.)** Ann. di Ottal., 1930, v. 58, Jan., p. 28.

There has been a prevailing opinion that phlyctenulosis if not actually of tuberculous origin was closely related to the tuberculous constitution. The experiments and clinical observations of the author were undertaken to determine to what extent the condition was allergic. In keratoconjunctival phlyctenules the reaction to tuberculin is almost always markedly positive, although no tuberculous focus may be discovered. Phlyctenular inflammations are apt to occur during convalescence from acute infectious diseases. It has been shown that when a latent tuberculous condition is present, as in the lymphatic or scrofulous diathesis, it may be activated by the introduction of some other substance, such as the toxin given off from dead streptococci. If horse serum be injected under the conjunctiva of an animal that has previously received a subdermal injection of the same serum, a moderate reaction in the eye follows. If this be repeated for some time with stronger doses, an actual anaphylactic shock with gangrene of the part follows. In the case of a twelve-year-old boy with phlyctenules in both eyes and facial eczema the tuberculous reaction was negative. After a short stay in the hospital the eyes were cured but the general condition grew worse. A pulmonary tuberculous focus was discovered, which after long treatment recovered. After this the cutaneous reaction was positive.

In animals previously injected with tuberculin it is possible by dropping tuberculin into the conjunctival sac to produce inflammatory points resembling phlyctenules. The author concludes that there is a specific allergy and a heteroallergy, in the latter of which, when latent tuberculosis is present, an ocular reaction may be activated by other substances than tuberculin. *Park Lewis.*

Lumbroso, U. **New researches on the etiology of trachoma.** Compt. Rend. Acad. Sci., 1930, v. 190, p. 1,026.

Following Noguchi's technique, Lumbroso isolated in culture from five of seven severe cases of untreated trachoma a microorganism either identical with or closely related to the bacterium granulosis of Noguchi. Cultures inoculated into a magot (Macacus inuus), previously determined to be free from spontaneous granulations, gave rise to a generalized granular eruption. In view of the special susceptibility of this animal to trachoma, Lumbroso concludes that the result obtained is favorable to the rôle attributed by Noguchi to B. granulosis in the etiology of trachoma.

Phillips Thygeson.

McHenry, D. D. **Practical points in the treatment of trachoma.** Jour. Amer. Med. Assoc., 1929, v. 93, Oct. 26, pp. 1291-96.

McHenry contends that trachoma is curable in ninety-nine percent of cases. Drugs alone will rarely cure trachoma in its chronic stages. Any surgical procedure that will entirely eradicate the trachoma follicles and their contents, with minimum destruction of the normal conjunctiva, is adequate. Infection of the caruncle and of the semilunar fold is an almost constant feature in cases that relapse or resist treatment, and in any case it is highly important to include the caruncle and the semilunar fold in surgical procedures. Most chronic cases show hypertrophy of the orbicularis muscle with blepharophimosis, and a radical canthoplasty should precede other operative measures. Tarsectomy has no value in the treatment of active trachoma, but is indicated in cured or nearly cured cases in which the lids are thickened and distorted. Surgical procedures alone will result in cure in only a small percentage of cases of trachoma unless follow-up examinations are made from one to two years, any follicles that may appear during that time being watched for and destroyed. Pannus, in itself, usually requires but little treatment. Destruction of the vessels in any manner is of little value. Where there is thickened gelatinous pannus, clearing of the cornea may be hastened several weeks by scraping away the pannus.

The author's method of expression is described in detail. A report of discussion follows. *George H. Stine.*

Pagés, R. **Surgical diathermy in trachoma.** Revue Intern. du Trachôme, 1930, v. 7, Jan., p. 16.

Pagés concludes that surgical diathermy is of decided value in the treatment of trachoma, finding its best indications in early lesions where all the diseased tissue can be destroyed at one time. In advanced lesions, however, it is not entirely successful and other measures tending to produce a progressive sclerosis are necessary.

Phillips Thygeson.

A recent case of monocular trachoma. Third annual report of the Giza Memorial ophthalmic laboratory, 1928, p. 35.

The patient, an oculist, was injecting cocaine solution into the upper lid of a patient suffering with trachoma, when the conjunctiva burst and the fluid spurted into his left eye. He immediately irrigated his eye with a strong solution of cyanide of mercury and formol for fifteen minutes. Two days later the inner angle of the eye was red and was itching. After forty-eight hours more the eyelids became swollen and inflamed and the eye blood-shot and tender. He began treating the eye with twenty percent argyrol every fifteen minutes and with three percent xeroform ointment at night. Later he began to paint the conjunctiva with two percent silver nitrate followed by xeroform ointment and continued this treatment for three weeks, at the end of which time the lids appeared much improved. One week later, however, the lids became violently inflamed again and there was a mucopurulent secretion.

By the end of two months after infection, typical follicles of the first stage of trachoma were present over the upper tarsus. With the slit-lamp, infiltration of the limbus was seen, with vessels extending into the cornea. Con-

junctival scrapings revealed no inclusion bodies and cultures yielded staphylococci only.

Phillips Thygeson.

Rutherford, C. W. **Membranous conjunctivitis with loss of eyeballs.** Jour. Amer. Med. Assoc., 1929, v. 93, Dec. 7, p. 1779.

Two cases, and the results of inquiries sent to one hundred ophthalmologists, are reported, and a thorough review of the literature is given. The author concludes that membranous exudates are intercurrent conditions which cannot be originated by injuries or organisms alone. A predisposition or susceptibility must be present. This can result from an injury, slight or severe; from a local inflammation in the incubation, active, or convalescent stage; or from a general disease which has lowered the patient's resistance to a new infection. To the predisposition must be added organisms that are pathogenic.

Membranous exudates of relatively short duration occur in some cases of diphtheria; they also occur in a recurrent form of prolonged duration, especially if streptococci are present. Frequently both eyes are affected. The principal complication is ulceration of the cornea with intraocular infection and loss of vision, if not loss of the eyeball. The treatment of the recurrent variety is usually without effect. The membranous exudation on the conjunctiva is only a symptom, usually of some general disease in which the ophthalmologist may have a consultation interest, or of an infection within the orbit in which he has surgical responsibility. (Discussion.)

George H. Stine.

Strebel, J. **Permanent cure of so-called vernal catarrh by the kelene (ethyl chloride) cauterization method.** Schweiz. med. Woch., 1930, v. 60, March 8, p. 227.

The method has given excellent results in the tarsal form and in the tarsal lesions of the combined form. The author reviews the differential diagnosis, deprecates the use of zinc sulphate, yellow oxide of mercury ointment, and silver nitrate, and, on the basis of nineteen cases treated successfully in the past ten years, recommends cryotherapy. Under anesthesia secured by instillation, followed by filling the grooves between the nodules with cocaine in substance, and with a contact glass on the cornea, the everted upper lid is sprayed with ethyl chloride until frozen. This makes the nodules stand out very prominently, and they are easily snipped off with scissors. The base is then cauterized with a thermocautery. No deformities of the lids have ever resulted from the procedure. In view of the facts that the majority of cases occur between the ages of nine and seventeen years, and that most cases get well spontaneously with the onset of puberty, the author considers vernal catarrh an allergic phenomenon on an endocrinopathic basis.

M. Davidson.

Treatment of trachoma. Third annual report of the Giza Memorial ophthalmic laboratory, Cairo, 1928, p. 54.

After two years experience it is concluded that chaulmoogra oil is not a specific agent in the treatment of trachoma but does, however, possess valuable antitrachomatous properties. Results are obtained in the advanced stages of trachoma which are comparable to those resulting from the usual methods of treatment, but with the advantage that treatment is painless.

A series of twenty-five children having bilateral trachoma in stage one were treated in the right eye with carbon dioxide snow and in the left eye with the copper sulphate stick. At the end of two months it was found that the results obtained with copper sulphate were definitely superior to those obtained by the use of the snow.

Phillips Thygeson.

Weymann, M. F. **Argyrosis of the conjunctiva.** Jour. Amer. Med. Assoc., 1929, v. 93, Nov. 2, pp. 1367-1368.

Following the work of Stillians and

Lawless, Weymann has worked out a quite satisfactory technique for the relief of argyrosis of the conjunctiva. Using sterile water and sterile bottles, two solutions are made, one containing twelve percent of sodium thiosulphate, and the other two percent of potassium ferricyanide (not ferrocyanide). The solutions are not further sterilized. The conjunctiva is anesthetized with a five percent solution of cocaine, and epinephrin is instilled. Two parts of ferricyanide solution are mixed with one part of thiosulphate solution, and from 10 to 15 minims (0.6 to 0.9 c. c.) is drawn into a two c. c. syringe with a number 26 platinum needle (stainless steel is corroded by the solution). The solution is injected as superficially as possible under the pigmented conjunctiva, the needle point being moved to as many different areas as possible while the fluid is being injected. After withdrawal of the needle the bleb should be massaged thoroughly through the closed lids. The injections are repeated wherever the pigment is most dense. In areas in which two injections overlapped, there was some further clearing on the second injection.

There is some pain, but the reaction is less than one gets from the same amount of five percent saline subconjunctivally injected. There is no pain an hour after the injection, and the eye is quiet within twenty-four hours. Three photographs show most satisfactory cosmetic results. (Discussion.)

George H. Stine.

Wolchonsky, S. **Prowazek's inclusions in trachoma.** Klin. M. f. Augenh., 1930, v. 84, April, pp. 544-547. (1 curve and 5 ill.)

Two hundred and forty cases were examined, and in two hundred and twenty the trachomatous conjunctiva was scraped. The follicles of only eight trachoma cases contained no inclusions. From his observations and the numerous statements in the literature, the author considers the diagnostic value of inclusions in trachoma as beyond doubt. By a very simple method the examination of scrapings is possible in any laboratory.

C. Zimmermann.

6. CORNEA and SCLERA

Aureliano, F. **Technique of the physical therapy employed in certain forms of parenchymatous keratitis.** Ann. di Ottal., 1930, v. 58, Jan., p. 45.

Parenchymatous keratitis, whether of syphilitic or of tuberculous origin, has a similar basic pathology. The first differs from the second only in its greater gravity, and may be complicated by a greater destruction of tissue. The initial stages, lasting perhaps two months, and accompanied by photophobia, lacrimation, pain, and redness of the ball, are not suitable for radiant treatment. After this has passed with the cornea clouded and the more superficial vessels beginning to disappear, lymphatic activity may be stimulated and a possible thinning of the cornea and even ectasia may be prevented by the judicious use of the roentgen ray.

Benefit does not follow intense or protracted applications. They must be very brief and carried over a long period of time. In tuberculous cases the improvement is hastened by general treatment with ultraviolet light. The x-ray irradiation is given under most exact dosage through an aluminum-zinc filter and at intervals of not less than eight day periods. Definite improvement may not be expected for months. In one case in which marked benefit was ultimately obtained the treatment was continued for eighteen months before the corneas began to clear.

Park Lewis.

Baer, G. **Tattooing with chloride of gold.** Ann. di Ottal., 1929, v. 57, Oct.-Dec., p. 900.

The old method of tattooing with "India ink" required much patience on the part of the operator and the patient! Moreover it was not permanent, as in a short time the particles migrated from their place of insertion. The trepanning of the cornea and the introduction of India ink were often followed by too violent a reaction. The method pro-

posed by Paul Knapp in 1925 was warmly accepted. It consisted in coloring the cornea, from which the epithelium had been stripped, with a preparation of colloidal gold, and many successes were published concerning this method. There are also unsuccessful cases, sometimes due to great reaction, sometimes due to disappearance of the stain. In this author's case of keratoconus the point of projection was lightly touched with the galvanocautery. This was repeated at intervals of five or six days until a cicatrix fairly dense and without vascularity was produced. Under cocaine anesthesia a circle was marked in the scar tissue and the surface removed with a curette. A solution of chloride of gold which had been neutralized by bicarbonate of soda was applied by means of a small pledget of cotton to the exposed surfaces. This was changed every minute for five minutes. In the same manner a fresh solution of tannin one percent solution was applied each minute. The part treated at the beginning of the procedure was yellow brown, but it gradually became darker. For three days the wound was treated with ophthalmic ointment. There was little reaction and the result was most satisfactory. About eight months later the patient returned and the staining had begun to pale. Under the slit-lamp the particles were found regrouped in the form of the sunflower arrangement found in the traumatic cataract of copper. Certain observers have found chloride of platinum more durable.

Park Lewis.

Brückner, and Knapova, F. **Exogenous argyrosis of Descemet's membrane and of the elastic lamina of the cornea.** Rev. Gén. d'Opht., 1929, v. 43, p. 215.

The clinical picture of primary argyrosis of the cornea (with no alteration of the surface) has only been known within the past few years. We owe its recognition to the slit-lamp. Subal (1922) reported the case of a silver polisher who had worked at his trade fifty-one years. He had argyrosis of the conjunctiva and of the deep layers of the cornea. In the following years several reports of argyrosis affecting mainly the deep layers of the cornea were published. These included five workers in silver azotate with coloration of Descemet's membrane and the anterior capsule of the lens but not the conjunctiva. In these cases the absorption of the silver was probably through the respiratory and digestive tracts. The authors report a case of argyrosis in a woman who used eye drops of some solution of silver over a period of thirty years. The conjunctiva of the lower lids and the deep layers of the cornea were grayish. The endothelium was intact. It is noted that in the anatomic descriptions of Knies in cases of argyrosis of the cornea Descemet's membrane is said to be intensely colored and to seem to have a specific avidity for silver. Knies explains the penetration of the silver as follows: The salt penetrates the cornea as albuminate of silver, is deposited in the tissue of predilection and is reduced to metallic silver or the oxide. Nakamura in 1923 determined by colorimetry the quantity of solution absorbed by the cornea and penetrating to the anterior chamber. He stated that solutions introduced into the conjunctival cul-de-sac were absorbed mainly by the cornea and not by the conjunctiva or sclera. (Bibliography of sixteen papers.)

J. B. Thomas.

Filatow, W. P. **Keratitis meibomiana.** Klin. M. f. Augenh., 1930, v. 84, March, pp. 380-384. (Also published in Russkii Oft. Jour., 1930, v. 11, pt. 2, pp. 297-304.)

Filatow attributed several cases of keratitis, which resisted ordinary treatment, to hypersecretion of the meibomian glands. The keratitis occurred in the form of the so-called catarrhal ulcers of the cornea, and as yellowish infiltrations and ulcers complicating trachomatous pannus. By compressing the lids with thumb and index finger a large quantity of oily opaque liquid content of the meibomian glands was evacuated This procedure was followed by immediate improvement of the kera-

titis, which had caused pain and photophobia. If the hypersecretion is very marked and obstinate, the lid may be split into two layers by an intermarginal incision, and the exposed meibomian glands on both wound surfaces curetted, with subsequent suture.

C. Zimmermann.

Kubik, J. **The basis of the pseudosclerosis ring (Kayser-Fleischer).** Klin. M. f. Augenh., 1930 v. 84, April, pp. 478-492. (7 ill.)

Two cases are reported which controvert the opinion of Vogt that the basis of the pigment ring in pseudosclerosis is silver. The chemical proof of solubility in potassium cyanide is not sufficient, since, beside silver and gold, almost all organic pigments are soluble in solutions of this substance. The basis of the pigment ring in the two cases of the author's is an autochthonous pigment of catabolic origin. In more recent cases it is located between the endothelium and Descemet's membrane. In older cases the pigment merely migrates mechanically from the endothelium into Descemet's membrane. *C. Zimmermann.*

Loddoni, G. **Keratoconjunctival phlyctenulosis and allergy. (Clinical and experimental research.)** Ann. di Ottal., 1930, v. 58, Jan., p. 28. (See Section 5, Conjunctiva.)

Manes and Moulie. **Symmetrical marginal dystrophy of both corneas, with spontaneous hernias of the iris.** Arch. de Oft. de Buenos Aires., 1930, v. 5, no. 1, Jan., p. 5.

This affection was first described by Terrien in 1900 and since then ten additional cases have been recorded. The present case occurred in a thirty-seven year old man, who noticed several small nodules on the right eye three years before, and which had recently appeared also in the left. They proved annoying, although not really painful, nor did they interfere with vision.

The first sign was the development of a faint gray line on the cornea adjacent to the limbus, with slight irritation and photophobia. Then in the right there appeared these small, painless, dark colored nodules; the left eye underwent substantially the same change. The right eye showed a sector shaped vascularization of the bulbar conjunctiva at eleven o'clock, with a hernia of the iris at its apex near the limbus. The central portion of the cornea was normal. Around the periphery but separated from the limbus by a normal interval was a light gray line 1.5 mm. in width, appearing as an exaggerated arcus, but continuous throughout.

The portions of the cornea lying between this line and the limbus appeared thinner than normal, and in its upper portion was a slight furrow. The cornea presented no other ectasia except that at eleven o'clock, where it was elevated about 2 mm. with absence of its layers and through which was a small prolapse of the iris. This hernia was still covered by conjunctiva, which had advanced here over the cornea. In spite of the prolapse, the pupil was scarcely deformed. The left eye showed substantially the same picture, except for a pear-shaped pupil, and anterior and posterior synechiæ. Nothing was found on general physical examination, that shed any light on the probable cause of the eye condition.

Pathologically, this furrow has been found to depend upon a gradual degeneration of the corneal layers, with replacement by vascular tissue derived from both the sclera and conjunctiva. The involved area does not stain by fluorescin and corneal anesthesia is lessened. In the case described by Fuchs, the corneal layers were found reduced in number, Bowman's membrane having disappeared completely, and being replaced by a lax tissue rich in nuclei. The epithelium retained its normal appearance.

It is evident that the process is degenerative and not inflammatory in origin. The prognosis is unfavorable on account of its liability to secondary glaucoma. Treatment is entirely symptomatic; iridectomy is indicated in an endeavor to forestall increase in tension. *A. G. Wilde.*

Mazal, Vladimir. **Keratitis disciformis and injury.** Oft. Sbornik, 1929, v. 4, pp. 164-170.

Fuchs and his school give the cause of disciform keratitis as injury. Peters and his followers believe the etiology is a neurotic disturbance. The author's six cases followed injury, but he thinks the injury was only a contributing factor. Each case presented a slightly different picture, several simulating herpetic infection. Experimentation on rabbits failed to produce a true disciform keratitis. (Bibliography.)

G. D. Theobald.

Pillat, Arnold. **Leprosy bacilli in the scraping from the diseased cornea in a leper, and comments on keratitis punctata superficialis leprosa: report of a case.** Arch. of Ophth., 1930, v. 3, March, pp. 306-17.

Keratitis punctata superficialis, pannus leprosus, and keratitis interstitialis leprosa are held in most adults to be real manifestations of leprosy. Many intercurrent ocular complications, however, may arise and may possibly be responsible for the above conditions, or in the nervous type (maculo-anesthetic) they may be the result of disease of the trigeminus nerve, that is, neuroparalytic keratitis, or they may be the result of exposure keratitis. The author strongly recommends scraping the corneal and conjunctival epithelium for determining the presence of the leprosy bacillus. He follows the technique of Lindner; that is, after cocainizing, the epithelium is scraped with a platinum spatula, following which the eye is bandaged for one-half hour. Staining is according to the Ziehl-Nelson method for tubercle bacilli.

In the case reported, the right cornea showed many fine, somewhat linear opacities, built up by pin-point greyish white nodules, lying near the surface of the cornea, but covered by a normal epithelium. There was a similar condition in the left cornea. The nodules lay behind Bowman's membrane, were irregular in shape, and dentated at the margins, and consisted of many minute dots. There was no tendency to confluence. The nerves of the cornea were more distinct than normal and showed definite nodules on their course, which often attained a size double the diameter of the nerve. Leprosy bacilli were found in about twenty-five percent of the epithelial cells removed in scrapings. A few were found outside. It is possible that the condition under discussion may be connected with pannus leprosus and with interstitial leprous keratitis in the sense that one type may change into another, the latter being found when the bacteria multiply. Leprosy bacilli were found in the lower half of the cornea and in the conjunctiva of the lower lid, although both places were normal clinically.

M. H. Post.

Pischel, D. K. **Tattooing of the cornea with gold and platinum chloride.** Arch. of Ophth., 1930, v. 3, Feb., pp. 176-181.

The technique of tattooing the cornea with gold chloride is given by the author as follows:

(1) Anesthesia is produced by cocaine or phenacine, without epinephrin. (2) The epithelium is carefully scraped off the area to be stained. (3) Hemorrhage must be stopped. (4) A cotton pledget the size of the denuded area, first dipped in faintly acid two percent solution of gold chloride, is held against the denuded area, and is replaced by a fresh one every minute for about five minutes. The pledget should not be dripping wet. (5) Then epinephrin, or the more effective two percent tannic acid, should be dropped on the cornea from one to two minutes, after which the eye is flushed with normal saline and bandaged.

Three to five percent gold chloride should be used for very dense scars. Any scar can be so stained. The results are fairly satisfactory. Vascular leukomas are harder to stain, and the stain fades faster. The best results are dark brown or grey black.

Tattooing with platinum is more intense and more metallic in appearance, and simpler in technique. (1) The area is prepared in a similar manner.

(2) It is washed with sterile water. (3) Two percent platinum chloride is applied as for gold chloride. (4) Reduction is accomplished by placing a drop of hydrazine hydrate on the area stained, for twenty-five seconds, then washed with sterile water, when the color promptly appears. (5) After two minutes the eye is washed with normal sodium chloride, and then bandaged.

It is noted also that gold chloride may be reduced with better effect with hydrazine hydrate. The author finds of definite value the use of fluorescein to delimit the area to be stained. It is used after step two, but is washed off thoroughly before applying the platinum chloride.

In both methods there is slight pain for twelve hours, followed by ciliary injection for twelve more hours. Sufficient time has not yet elapsed to determine the permanence of the platinum chloride stain. *M. H. Post.*

Sabata, Jan. **Parenchymatous keratitis in advanced age.** Bratislavske Lekarske Listy, 1930, v. 10, Jan., p. 29.

The author reports a case of double parenchymatous keratitis of specific etiology, in a woman of fifty-six years. *Ray K. Daily.*

Schuster, Erna. **A case of pigment spindle of the cornea.** Zeit. f. Augenh., 1930, v. 70, Jan., p. 160.

A single case of Krukenberg's spindle is described in detail because of its rarity. Nothing new is added which might aid in clarifying our understanding of the phenomenon. *F. H. Haessler.*

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Burnham, G. H. **Sympathetic ophthalmia: the successful treatment of a patient with an acute case.** Arch. of Ophth., 1930, v. 3, Feb., pp. 200-207.

The author divides sympathetic ophthalmia into three varieties or degrees. The first is sympathetic irritation, the second a cyclitis with punctate keratitis, the third the dreaded sympathetic inflammation with copious exudation into the tissues of the eye. The first two clear up following removal of the injured eye. The third often persists despite this.

The author's "combined treatment" for this third degree consists of ten subcutaneous injections of pilocarpin on successive days, beginning with 1/12 grain and increasing to 1/4 in some cases. He prescribes mercury, and sodium iodide and bromide, in the intervals between these treatments. The intervals between treatments are six weeks at first, being increased as time goes by. In the case reported, this method of treatment was continued for a period of three years, resulting eventually in raising the vision from light perception to 6/9. Failure to attain perfect vision was attributed to inability to remove all the exudate from the pupil by this method, and could have been avoided, the author believes, had the patient consented to institution of the treatment somewhat earlier. *M. H. Post.*

Granstrøm, K. O. **A contribution to the study of cysts arising from the posterior surface of the iris.** Acta Ophth., 1930, v. 8, p. 35.

The author reviews the literature and reports a cyst arising from the epithelium on the posterior surface of the iris. There was no history of traumatism, no irritative symptoms, no rise of tension, and no increase in size during the two years that the growth was under observation. The author calls attention to the fact that such growths may be benign and do not call for immediate surgical intervention. (Two illustrations.) *Ray K. Daily.*

Grønvall, H. **On the occurrence of citric acid in the aqueous humor.** Acta Ophth., 1930, v. 8, p. 45.

The author found citric acid in the aqueous humor of animal eyes, and one human eye enucleated because of a melanosarcoma. The method of de-

termination is based on an enzyme found in cucumber seeds (citricodehydrogenase), which reacts with citric acid to form active hydrogen.

Ray K. Daily.

Iga, Fuminori. **Focal reactions in intact eyes after parenteral introduction of heterologous serum.** Klin. M. f. Augenh., 1930, v. 84, April, pp. 449-478. (28 ill.)

Iga gives a clinical and histological report of his experiments on rabbits. They show that heterologous sera (of the horse, cat, and chicken) may exert a primary toxic action on certain places far distant from the application. Even after only one small dose, injected into the blood, this effect appears as lymphocytic infiltrations of the uvea of both eyes. Repeated injections have a cumulative effect. Apparently this is a capillary intoxication and the very vascular uvea is a place of predilection, as are also the lungs, liver, and brain. It is not an elective sensitization from eye to eye, as shown by the fact that the identical clinical and histological pictures may be produced in both eyes by introduction of heterologous serum into the blood current. The same phenomena are observed after sensitization of the anophthalmic orbit and reinjection into the blood, when the elective action of one eye upon the other is of course excluded. Thus an analogy with human sympathetic ophthalmia, as stressed by Riehm, cannot be inferred from these experiments.

C. Zimmermann.

Jeandelize and Bretagne. **Stages of sympathetic ophthalmia as seen by biomicroscopy, with the practical result of an early diagnosis.**. Arch. d'Opht., 1930, v. 46, Feb., p. 47.

In one case enucleation of the right eye was done five weeks after a perforating wound at the limbus. One week after the enucleation the vision in the left eye had dropped to 1/50, although no inflammation could be detected in the anterior segment by the usual methods of examination. Ophthalmoscopic examination showed a peripapillary retinitis. The biomicroscope showed several precipitates on the posterior surface of the cornea. The diagnosis of sympathetic ophthalmia was made and the eye recovered normal vision after intensive treatment.

In the second case a Lagrange operation was done upon the left eye. Nine days later the eye appeared perfectly quiet, but eleven days after operation an iritis began, accompanied by precipitates on the cornea. At this time the right eye appeared normal. Eighteen days after operation precipitates were found on the cornea of the right eye with the biomicroscope. There were no subjective symptoms. It was five days later before these precipitates could be seen with the loupe. Under intensive treatment the inflammation cleared up in both eyes. Both these cases were considered as more or less benign types of sympathetic ophthalmia and could only be so diagnosed by means of the biomicroscope.

M. F. Weymann.

Saba, V. **Acquired heterochromia in a case of resection of the trigeminus.** Ann. di Ottal., 1929, v. 57, Oct.-Dec., p. 864.

The etiology of reported cases of heterochromia is always obscure. The following classifications have been adopted: congenital, congenital with consecutive cyclitis, postglaucomatous, postcyclitic, in the adult with and without cyclitis, with ocular siderosis. In the case reported a heterochromia of the iris on the same side had followed resection of the trigeminus. After a considerable interval of time, a type of cyclitis found with lesions of the cervical sympathetic had slowly supervened. The cyclitis could not be attributed to specific causes but to disturbance of innervation of the cervical sympathetic as a direct consequence of resection of the trigeminus.

Park Lewis.

Wolf, Samuel. **Choroideremia.** Arch. of Ophth., 1930, v. 3, Jan., pp. 80-87.

A case of choroideremia was first reported in 1871, by Mauthner. The symptoms were similar to those of ret-

initis pigmentosa, but the ophthalmoscope showed a whitish-green fundus. The discs are normal in color, the vessels slightly smaller than normal. Occasional patches of choroid may be present where the fundus assumes its normal color, and choroidal vessels may be seen. The choroid of the macular region is the part most frequently spared. Mauthner gave this disease its name. The nine cases appearing in the literature are abstracted in this paper and two others are added. Nettleship and Connor have ascribed the condition to arrested development. *M. H. Post.*

8. GLAUCOMA AND OCULAR TENSION

Bell, G. H. **Iridotasis for primary and secondary glaucoma.** Arch. of Ophth., 1930, v. 3, Feb., pp. 194-199.

Forty cases are reported. The results in the acute inflammatory type were six good, four poor; chronic type ten good, none poor; absolute type ten good, none poor; secondary type, nine good, one poor; buphthalmos type none.

The author does not hasten cases to operation, but first prescribes a rigid régime. The teeth are carefully studied, the tonsils, if present, are removed. Wassermann and blood pressure tests and urinalysis are carried out. Chemical analysis of blood and feces are made. Endocrine disturbances are looked for. A diet containing acidophilus milk and lactose is prescribed. Pilocarpin and hot applications are used three times a day. The operation of iridotasis is especially recommended in the chronic types and after failure with other operations. Reese's iridectomy is to be preferred in the acute inflammatory types, or where cataract extraction is likely to be required at some future date. *M. H. Post.*

Bistis, J. **The rôle of the sympathetic in glaucoma.** Arch. d'Opht., 1930, v. 46 Feb., p. 96.

After stimulation of the superior cervical sympathetic ganglion in six rabbits, an increase in intraocular tension was noted in five of them. This increase was thought to be due to the vascular distention caused by sympathetic stimulation. *M. F. Weymann.*

Cirincione, Giuseppe. **From the forthcoming unpublished treatise on ophthalmology. (Glaucoma.)** Ann. di Ottal., 1930, v. 58, Jan., p. 3.

At the time of his death Professor Cirincione left about fifteen hundred pages, recording observations, investigations, and clinical studies which he proposed later to publish in the form of a work on ophthalmology. The journal of which he was editor and founder has begun the publication serially of these important papers. The first on glaucoma is written with the care which marked all of his work. Glaucoma is divided into two groups, the irritative and nonirritative; the former again into acute and chronic; the latter into glaucoma simplex and infantile or hydrophthalmia. The prodromal symptoms are carefully noted. Under the acute irritative form the phases under which the disease is manifested are heightened tension, a shallow anterior chamber with pushing forward of the iris diaphragm, dilatation of the pupil which is oval and reacts sluggishly to light stimulus, diminution of visual acuity. The diagnostic features characterizing irritative glaucoma are conjunctival edema sometimes involving the lid; pericorneal injection chiefly of the venous trunks, clouding of the cornea with diminished sensibility, narrowing of the anterior chamber, discoloration of the iris with atrophic spots and thinning and graying around the pupillary margin; pupil large, oval, reacting slowly to light, increased tension, pain in the globe and under the supraciliary region and in the corresponding side of the face, general malaise, diminished visual acuity until light perception is lost. Those of chronic glaucoma are equally pronounced. The symptoms are so clearly defined that they would admirably serve as a basis for a popular leaflet in order that the initial symptoms might be recognized both by general physicians and patients at their early inception when treatment may be successfully applied. *Park Lewis.*

Derby and others. **A portable adaptometer.** Arch. of Ophth., 1930, v. 3, Jan., pp. 31-46.

Previous papers by the same authors have shown that the light minimum test is of greater value in the diagnosis of glaucoma than the light difference test. The present paper describes an apparatus for the light minimum test which may be used in routine practice in the physician's office.

The requirements for such an instrument are: (1) that the scale be so standardized that observations made at varying times may be accurately comparable, and expressed in absolute units; (2) that the range of brightness be sufficiently great to include all the normal and pathological differences which may be met with at all periods of adaptation, approximately from 1 to 30,000 micromillilamberts; (3) that it shall be easily operated; (4) that sufficient data on normal individuals should be available to delimit the normal variations.

Other adaptometers in use are referred to and then the author's own apparatus is described in detail. The source of illumination is a frosted 15-watt Mazda lamp, operated at a constant voltage. The light from this lamp is projected through two apertures covered with frosted glass in the first instance, and with single flashed opal glass in the second. The light rays also pass through two lenses. The result is a uniform illumination of the second aperture of such size that at 130 cm. it subtends a visual angle of 3.3 degrees. The brightness of the spot is varied by passing the light rays through two circular photographic film wedges which rotate in opposite directions to one another. The point at which they are set can be determined at all times by an indicator. The method of calibration is described: a scale is supplied with the instrument.

For practical use the following suggestions are made: Three drops of pilocarpin are instilled, after which thirty minutes are allowed to elapse before the measurements are begun. During the last ten of these a white screen is placed 27 in. in front of the patient, illuminated by two 100-watt Mazda lamps four feet from the screen and behind the patient. Then three readings are made at ten-minute intervals. The size of the pupils is then measured and the readings corrected accordingly, and the curve thus found is compared with the normal curve. *M. H. Post.*

Farina F. **Intraocular hypertony and true glaucoma. (An etiopathogenetic and clinicotherapeutic study based on the neoroendocrinologic doctrine.)** Arch. di Ottal., 1929, v. 36, Nov., p. 417.

Intraocular hypertension due to functional causes pure and simple is differentiated from true primary glaucoma by absence of those anomalies of intraocular histopathology characteristic of the various clinical forms of glaucoma proper. But polyhormonic dysfunctions may influence the production of either functional or organic hypertension. Alike in hydrophthalmos, in functional hypertension and in glaucoma proper, the factor of endocrine dysfunction is predominant. The thyroid and gonads have first importance, then come the adrenals, hypophysis, and parathyroid. The author believes that opotherapy should be added to the local and surgical treatment of glaucoma. *David Alperin.*

Fiore, Tito. **Radical care of glaucoma by the igneous sclerociliarotomy of Fiore.** Ann. di Ottal., 1929, v. 57, Oct.-Dec., p. 820.

The operation described appears to have been a family property, originated by the father and carried out by the two sons. It is suitable for all forms of glaucoma, and for it extravagant results are claimed. It consists of a tunnelling of the sclerotic by means of the Paquelin cautery on its long diameter, beginning one millimeter back of the limbus and making a track five to six millimeters in length. This penetrates the fibrous layer and includes the anterior segment of the sclera, the iris angle, the ciliary body throughout its

lateral extent, the anterior extremity of the chorio-retino-ciliary muscle, the canal of Schlemm, and the hyaloid. After the aqueous is evacuated and the vitreous appears in the wedge-like opening, the operation is complete. The eye is then bandaged. *Park Lewis.*

Green, A. S., Green, L. D., and Green, M. I. **Glaucoma: factors underlying success in trephining.** Arch. of Ophth., 1930, v. 3, March, pp. 297-300.

In a short paper the authors describe their present method of trephining in glaucoma, recommending that the trephine be tilted in such a way that the disc is severed last at its scleral margin, and that a minute peripheral iridectomy be done instead of a large iridectomy less peripherally placed.
M. H. Post.

Hamburger, Carl. **Glaucoma and glaucosan drops.** Brit. Jour. Ophth., 1930, v. 14, April, p. 172.

The author recommends medical treatment for the chronic forms of glaucoma. Treatment of this condition is difficult and a cure cannot be done by one stroke. The unreliability of operative procedures is proven by the many methods suggested. Good technique does not necessarily guarantee good succcess as illustrated by case histories in which operations were performed by famous oculists with unsatisfactory results. With the addition of glaucosan nonoperative results have been more successful. For glaucoma simplex the writer urges first of all miotics; in case they suffice, nothing else. If, in spite of miotics, the tension remains high, only then are glaucosan drops indicated. As a rule, operation is not suggested unless and until all conservative means fail. A disadvantage in the use of glaucosan is the occasional ensuing rise of tension which as a rule subsides completely, later going to a much lower level; this rise is best treated by eserin. Best results are obtained by the cautious use of glaucosan guarded by miotics.

The author reports a case of binocular glaucoma in which one eye, previously operated, is growing slowly worse. The fellow eye has been under glaucosan-eserin treatment for five years with very satisfactory results. The illustrations and tonometric observations are conducted by the patient's wife.

Glaucosan is of especial value in glaucoma secondary to iritis with synechiæ, the drug acting as a most powerful mydriatic as well as lowering tension. *D. F. Harbridge.*

Kadyi, S. **Nevus flammeus of the face and juvenile glaucoma.** Klinika Oczna, 1929, Dec., pp. 176-178.

In a baby thirteen months old a vascular nevus occupying the right side of the face was associated with hydrophthalmos of the right eye. An iridectomy had little effect upon the intraocular pressure, which was lowered from seventy to sixty millimeters. The author agrees with the opinion of Salus that glaucoma in cases of vascular nevi of the face is due to a telangiectatic condition of the uvea. In his own case he was unable to detect similar changes in the choroid, but they were found in the conjunctiva and the iris of the hydrophthalmic eye. A marked decrease in intraocular pressure in the hydrophthalmic eye occurred coincidently with a severe diarrhea. This fact, in the author's opinion, substantiates his belief in the vascular origin of the hypertension in the case here reported.
M. Beigelman.

Melanowski, W. H. **Conjunctival bridge in the sclerecto-iridectomy of Lagrange.** Arch. d'Opht., 1930, v. 46, Feb., p. 105.

The writer describes his technique of the Lagrange operation using the conjunctival bridge. (Four illustrations.) *M. F. Weymann.*

Poos, F. **Clinical investigations on the relations between osmosis, blood pressure, and ocular tension. (Hypertony by lowering of the blood sugar in juvenile diabetes and in glaucoma with diabetes.)** Klin. M. f. Augenh., 1930, v. 84, March, pp. 340-359. (4 curves.)

By simultaneous recording of the blood sugar and tonometry in a youth with normal eyes and diabetes, or in glaucoma with diabetes, fluctuations of intraocular tension could be ascertained which depended quantitatively on fluctuations of the blood sugar and water content of the blood. Ingestion of carbohydrates and injections of insulin produced fluctuations of the blood sugar between 650 and 35 mg. per 100 c.c., the ocular tension fluctuating between 13 and 26 mm. Hg. The normal ocular tension with normal blood sugar of 100 mg. per 100 c.c. was from 20 to 21 mm. Hg., so that an increase to 26 mm. Hg must be considered as a relative hypertony caused by hypoglycemia. In the normal, fluctuations of ocular tension from changes of osmotic blood pressure are only transient. It is different in diabetes because changes of blood sugar content are associated with those of general water content of the body. Most likely the increase of the colloid osmotic blood pressure (from thickening of the blood by loss of water) plays an important part in creating the Heine-Krause symptom of softening of the eyeballs in diabetic coma. With progressive insulin hypoglycemia, parasympathetic irritative symptoms occurred in the form of miosis and spasm of the ciliary muscle, which disappeared after removal of hypoglycemia by introduction of carbohydrates. In hyperglycemic precoma the retinal vessels were enlarged, in hypoglycemic precoma this enlargement was less marked. In glaucoma with senile diabetes, ocular tension fluctuated before and after a meal up to fourteen mm. Hg. If the tension is not rendered normal by operation, insulin injections must be guarded on account of the subsequent increase of tension.

C. Zimmermann.

Tessier, G. **Intraocular tension in the normal eye in accommodation and in convergence.** Ann. di Ottal., 1929, v. 57, Oct.-Dec., p. 799.

Previous experiments by Salviati had shown an increase of tension when the eye changed from a static condition to that of accommodation and convergence. If this were true it would influence treatment of the glaucoma patient as to limiting the accommodative effort. Tests were made on a large number of subjects, some emmetropic, others having various refractive anomalies, and the results tabulated. Tonometric readings were taken over both the sclera and the cornea. The scleral readings were always the higher and varied from case to case. In the majority of cases there was found no difference in the distance and proximal readings. Slight variations, if not due to errors in determining the pressure, were probably due to the slight normal differences which constantly occur, and were not conditioned by the accommodative effort, age, sex, refraction, nor the condition of the extrinsic musculature.

Park Lewis.

9. CRYSTALLINE LENS

Argañaraz, Raul. **The origin of cataract and its medical treatment.** Arch. de Oft. de Buenos Aires, 1929, v. 4, no. 1. Jan., p. 5.

Following a résumé of the various theories of the causation of senile cataract, the author describes the changes in its medical treatment that have been advanced. Of these the iodides seem to have been mostly favored, following their introduction by Coudret in 1828, to be later advocated by Arlt in 1854. Badal reports nine percent of his cases improved greatly, fifteen percent improved somewhat, and sixty-two percent as remaining stationary after the instillation of the following solution: desiccated sodium iodide 5 gm., crystallized calcium chloride 5 gm., distilled water 400 c.c. Pflugk, who employed potassium iodide, reported fifty-four percent of his cases greatly improved, twenty-eight percent somewhat improved, and fifteen percent stationary. It is assumed that the remaining three percent were progressive, but the article does not state. He instilled into the conjunctival sacs for a year, twice daily, a solution of potassium iodide 0.25 gm. in 10 c.c. water. He also

used in advanced cases an eye bath composed of 2.5 percent of potassium iodide, gradually increasing to seven percent, the application lasting from two to five minutes, once or twice a day.

Elze obtained good results by introducing daily into the conjunctival sacs a small bit of ointment composed of resorcin 0.05 gm. in 10 gm. vaseline. Smith believes he has seen clearing of lens opacities following subconjunctival injections of 1:1000 to 1:4000 mercury cyanide. After instillations of one percent potassium iodide and its oral administration, followed by five percent dionin, Meyer Steinegg claimed that seventy-nine percent showed improvement, twenty-nine percent remained stationary, and only seven percent progressed. *A. G. Wilde.*

Elschnig, A. **Industrial cataract.** Med. Klin., 1930, v. 26, Jan., p. 43.

The author takes up the question of occupational cataract. He considers the pathology of two types of cataracts, the first which begins with posterior cortical opacities in the young glass blower, and is slowly progressive. He states that he never has had such a case to operate. The second is the cataract in the older glass blowers, which cannot be distinguished from senile or presenile cataract. There is also further change in these eyes, due to desquamation of transparent particles on the anterior lens capsule, which he interprets as zonular lamella.

Reports on cataracts of glass blowers date back to the middle ages, but anatomical studies have only been made recently. The author has found no difference in relation to the size of the nucleus, weight of lens, or color in comparison with senile cataract, but detached zonular lamella has been found, with no apparent capsular defect. The nuclear zone seems to be replaced by swollen cells, taking a pale eosin stain irregularly. The posterior capsule showed a small amount of proliferation.

The frequency of glass-blower's cataract in the author's clinic is slightly higher than that of senile cataract. The average age of glass blowers was 57 years, and in senile cataracts the average age was 64.5 years.

The theory of ultraviolet light causing cataract has been thoroughly disproved by Braun and others in their work on rabbits. The effect of red rays seems to be definite tissue damage as proved experimentally and by histological examination. This theory is strengthened further by the effect of x-ray and radium. The damage to the ciliary body and the change in the aqueous through the heat rays may cause typical glass-blower's cataract. The English committee came to the same conclusion in their report in 1928. Cataract as seen in the agricultural worker may be due to the radiation of the sun passing through the lower half of the lens. *Beulah Cushman.*

Meyer, Hellmuth. **Lenticular myopia from congenital microphakia.** Klin. M. f. Augenh., 1930, v. 84, April, pp. 525-531. (1 ill.)

The patient was a girl aged seven years. The corneas were clear, twelve millimeters in diameter, and showed astigmatism of one D. right, two D. left. In mydriasis (homatropin-cocaine) the border of the lens, with its slightly wavy indentations, appeared perfectly free throughout, and was surrounded by an aphakic zone from about one-half to one millimeter wide. On oblique illumination with daylight the border of the lens shone as a golden circle, the center dark. Clearly visible through the binocular loupe, the close array of taut zonular fibers extended through the alphakic zone, being inserted at two levels at a small distance from the edge of the lens and disappearing behind the iris. With the slit-lamp the anterior surface of the lens showed an abnormally high curvature, and still more the posterior surface. Skiascopy revealed right minus 15 D., left minus 14 D., in near fixation right minus 17 D., L. minus 16 D., a range of accommodation of 2 D., demonstrating that the lens was not as in ectopia, entirely devoid of the influence of contraction of the ciliary muscle. Vision was 6/50;

or, with minus 12 D., right 6/15, left 6/20.

Microphakia without ectopia is an extremely rare congenital anomaly. There are transitions from central microphakia to ectopia of the lens. Both belong to the same group. The prognosis depends on the resistance of the zonular fibers. *C. Zimmermann.*

Moreau. **Bacteriological examination previous to cataract extraction.** Bull. Soc. Franç. d'Opht., 1929, p. 235.

Moreau reports the results of bacteriological examination in one hundred patients, made previous to cataract surgery. In nineteen percent of the cases no bacteria were found; in forty percent staphylococci, one-sixth of these being the yellow variety; in nine percent corynebacteria and staphylococci; in twenty percent pneumococci with some streptococci; in ten percent mixed types including diphtheroid and diplobacilli; and in one percent the colon bacillus.

Elimination of the most dangerous microorganism, the pneumococcus, was accomplished by the use of one percent optochin for four or five days. The use of one percent $AgNO_3$ at the time of operative toilette was found ineffective in removing this bacterium. Broth vaccines were not entirely successful in preventing infection, especially if the lacrimal passages were stenosed. Moreau concludes that the results of bacteriological examination still leave the operator in doubt, especially as they represent only the condition at the time of culture and not necessarily the constant bacteriological situation.

Phillips Thygeson.

10. RETINA AND VITREOUS

Ballaban, K. **A case of spasm of the retinal artery cured by atropin.** Klinika Oczna, 1929, Dec., pp. 171-176.

The patient, a woman forty-three years of age, complained of sudden loss of sight in the right eye. On examination the central vision of this eye was found to be lowered to counting fingers at 25 cm., with total blindness in the upper part of the visual field. Ophthalmoscopically, a spasm of the lower branch of the central artery was diagnosed. Six retrobulbar injections of atropin (0.5 to 1 cm. of 1 to 1000 solution of atropin sulphate) resulted in complete restoration of the visual function. *M. Beigelman.*

Chaillous, J., and Garnier, M. **Clinical study of some cases of retinitis in hyperglycemic patients who have become aglycosuric.** Ann. d'Oculi., 1930, v. 167, March, pp. 205-213.

Four cases of this character are described with six excellent colored plates of the fundi. These observations show no difference from glycosuric fundus pictures. The authors stress the necessity of blood sugar tests in suggestive fundus conditions.

Lawrence T. Post.

Cords, Richard. **Detachment of the retina after accident.** Klin. M. f. Augenh., 1930, v. 84, Feb., pp. 222-229.

Cords discusses the question what kinds of injuries are blamed for the onset of detachment of the retina, namely perforating injury, contusion of eye, blow on the head, concussion of the whole body, intense physical strain. A perforating injury produces a predisposition to detachment, contusion of the eyeball only exceptionally, a blow on the head very rarely. Concussion of the whole body never causes detachment in healthy eyes, but, if very severe, may evoke it in predisposed eyes. Intense bodily strain is not an etiological factor, unless the patient complains of visual disturbance in the first three days or detachment is made out in the first eight days. *C. Zimmermann.*

Edmund, C. **Two rare cases of albuminuric neuroretinitis.** Acta Ophth., 1930, v. 8, p. 47.

The first case is in a nine-year-old girl who developed a typical neuroretinitis albuminurica in conjunction with an acute glomerulonephritis. The author believes that the changes were caused by arterial hypertension acting on the retina, the resistance of which was diminished by a nephrogenous intoxication.

The second case is in a woman thirty-seven years old, who, after a course of antiluetic treatment with bismuth, developed nephritis, polyneuritis, and enterocolitis—probably a bismuth intoxication. One month after the onset of these complications she began to complain of visual disturbance; fundus examination revealed a peripapillary and perifoveal ischemia and edema, striated hemorrhages along the blood vessels, and scattered pigment plaques in the periphery. Two months later she developed a double retinal detachment downward. The field and light-sense examination led the author to conclude that syphilis caused a syphilitic choroiditis while the bismuth intoxication through an arterial hypertension and nephritis gave rise to a retinitis. This latter process, owing to the choroiditis, was characterized by circulatory insufficiency and manifested as ischemia, hemorrhages, and exudation; the violence of the exudation produced the retinal detachment. *Ray K. Daily.*

Gyger, Rudolf. **The relation of medullated nerve fibers of the retina to Recklinghausen's disease.** Klin. M. f. Augenh., 1930, v. 84, April, pp. 523-524., (1 ill.)

In four out of twelve cases of Recklinghausen's disease H. Fischer found medullated nerve fibers in the retina. In looking through the records of the eye clinic at Basel, Gyger found medullated fibers in twenty out of 24,430 patients (from 1925 to 1929). Sixteen of these he himself examined with regard to symptoms of Recklinghausen's disease, with entirely negative results, so that medullated nerve fibers of the retina cannot be regarded as a symptom of a developmental anomaly in the sense of Recklinghausen's disease.

C. Zimmermann.

Larsson, S. **A contribution to the study of fundus changes in leukemia.** Acta Ophth., 1930, v. 8, pt. 1, p. 22.

In 1929 there were at the Seraphim Hospital 14 cases of leukemia. Of these seven were myelogenous and seven lymphatic. Five myelogenous cases had fundus changes which included venous dilatations in one case; vascular dilatation and hemorrhages in three cases; definite involvement of the papilla with hemorrhages in one case. Five of the seven cases of lymphatic leukemia had fundus changes consisting of slight venous dilatations and some edema of the papilla and its vicinity in two cases and more or less typical leukemic retinitis with changes in the papilla in three cases.

In all cases of leukemic retinitis the fundus picture was strikingly similar to the type of choked disc so often seen with high blood pressure and nephritis. A lumbar puncture demonstrated increased intracranial pressure although the patients did not complain of headache; renal function tests and urinalysis demonstrated impairment of renal function but none had high blood pressure. In one case of Mikulicz's disease with increased intracranial pressure, normal blood pressure, and diminished kidney function, the eye grounds had choked discs without retinal hemorrhages or exudates. From these findings the author concludes that the disc changes of leukemic retinitis are due to the increased intracranial pressure, and the changes in the retina are produced by the blood and blood-vessel changes. While evidence of disturbed renal function is usually present, he does not consider the renal disturbance as an etiological factor in the production of the eye-ground picture.

Ray K. Daily.

QUESTIONS AND ANSWERS

Edited by Dr. Lawrence T. Post

As mentioned in the June issue, this new department of the American Journal of Ophthalmology is for the present experimental in character, and its continuance will depend upon the reception accorded it by our readers. Questions on which advice is sought should be addressed to **Dr. Lawrence T. Post,** 524 Metropolitan building, Saint Louis, Missouri; and such questions will be referred by Dr. Post to sources whence appropriate answers are likely to be forthcoming. The reply will be sent to the questioner, and the Journal will publish the questions and answers which appear to be of sufficient general interest to warrant such action. The questioner's name will not be given, but that of the physician answering will be published unless he requests otherwise.

1. Eye-strain in retinoscopy

Question:

In my practice I use the nonluminous concave retinoscopic mirror, with a frosted electric-light bulb with bull's eye at one meter distance. I have found that after retinoscoping four or five cases my left eye, which I use exclusively for this work, becomes quite fatigued. As it frequently happens that I have several cases to refract during an afternoon it causes me considerable discomfort.

I have no doubt that the luminous type of retinoscope causes less strain upon the eye of the examiner, but after a thorough trial of the luminous type, I find that I am unable to obtain accurate results with it. This is probably because my training in this work was obtained by the use of the concave nonluminous mirror.

With a limited experience with the streak retinoscope, I find that one cannot work as rapidly as with the other types, due to the fact that one must shift the axis of the streak in refracting the various meridians.

I should like to know if you can give me any information as to means by which the strain upon the eye of the examiner may be minimized, or if you think it would be worth while for me to attempt to learn to use the luminous type of retinoscope.

Answer (from Dr. Edward Jackson, Denver): There is no reason to think that the luminous retinoscope would be better than the mirror type of instrument. There are various opportunities for strain of your eyes in retinoscopy. One who has lost his power of accommodation finds the patient's pupil easier to watch with a one diopter convex lens back of the sight-hole in his mirror, even though his eye is emmetropic or he is wearing his correcting lenses while testing. When the accommodation is easily fatigued, watching the movement in the pupil may cause pain. The source of light shining on the eyes may be a cause of discomfort.

The play of light and shade in the pupil is always hard to watch when the point of reversal is near the observer's eye. Watching the movement in the pupil image close to one's eye may strain the accommodation. Simply doing several retinoscopic examinations in succession might cause strain. Of course it is better to make such examinations at the time the observer is fresh. They cause fatigue not so much of the eye as of the general nervous system; and there is for each person a limit of nerve fatigue beyond which various symptoms may be caused. With the concave mirror there is not the same freedom of movement toward or from the patient's eye; and with this mirror it would be easy to fall into a habitual position, causing accommodative strain, to see what could be better seen by change of distance from the patient. Alternating the retinoscopies with other work might prevent the fatigue.

2.

(a) Color of disc in optic atrophy.
(b) When is cycloplegic necessary?
(c) Bismuth therapy in ocular syphilis.

Questions (Three were received from one subscriber):

(a) What gives the peculiar bluish color to the disc in some forms of optic atrophy?

(b) Has any test been devised to determine the necessity for cycloplegic refraction in the individual patient?

(c) What are the specific indications for bismuth therapy in the treatment of ocular syphilis?

Answers (from Dr. Harry S. Gradle, Chicago):

(a) The bluish color referred to occurs only in the so-called primary, or more properly descending, atrophy, and then only in the later stages of the disease. Histologically, there is an almost entire absence of nerve fibers which are replaced by glial fibers and myelin strands. As a result there is actually less tissue in cross section. Inasmuch as the color of any object is due purely to light reflected or transmitted by that object, any variation in the density of the object will have its result in the character of the reflected or transmitted light. The same process is present in atrophy of the iris, where loss of the superficial tissue results in marked bluish discoloration of the iris.

(b) No.

(c) Bismuth should be used in any case of ocular syphilis when the patient is "Wassermann-fast". Many oculists prefer bismuth to arsenical preparations in syphilitic disease affecting the optic nerve, still adhering to the old belief that a diseased optic nerve is over susceptible to arsenic, although modern clinical evidence does not bear out such belief. Otherwise, the preference as to bismuth or arsenic or mercury is the preference of the individual clinician based upon experience.

NEWS ITEMS

News items in this issue were received from Drs. C. A. Clapp, Baltimore; J. M. Patton, Omaha; G. O. Ring, Philadelphia; R. J. Sisson, Detroit; F. L. Wahrer, Marshalltown, Iowa; and F. L. Wicks, Valley City, North Dakota. News items should reach **Dr. Melville Black,** Metropolitan building, Denver, by the twelfth of the month.

Deaths

Dr. James M. Patton of Omaha died suddenly of angina pectoris on June twentieth.

Dr. Percy Clement Proctor, Gloucester, Massachusetts, aged sixty-two years, died April second.

Miscellaneous

The New York Catholic Center for the Blind was left $15,000 under the will of the late Mrs. Madeleine L. Ottmann.

The National Committee for the Prevention of Blindness was left $10,000 by the will of the late Mrs. Mary L. Walker Peters.

With the opening of the Denver public schools this fall a "sight saving" department will be established.

An increase of forty-five "sight-seeing classes" within the last year is noted in the report of the National Society for the Prevention of Blindness. There are now 350 of these classes for the education of children with seriously defective vision, in 95 cities of 25 states. Special courses to train teachers are planned this summer at Columbia University, the University of Chicago, the University of Cincinnati, and the State Teachers' College at Buffalo.

Our attention is called by a Denver member of the Guild of Prescription Opticians to the fact that the "Hickey bill", which would have entitled optometrists in the state of New York to use the title "doctor", has been defeated in the New York assembly.

A special meeting of the ophthalmic section of the Saint Louis Medical Society on May 24, 1930, in conjunction with the Saint Louis Society for the Blind, was in honor of Dr. George E. de Schweinitz, who was presented the Dana medal for the prevention of blindness for 1930. The presentation was made by Robert Johnston, president of the Saint Louis Society for the Blind, and Dr. B. Franklin Royer, medical director of the National Society for the Prevention of Blindness. Dr. de Schweinitz gave an address upon "The heritage of sight; its conservation", under the provisions of the Jacob Lampert lecture fund.

The first annual summer graduate course in ophthalmology of the School of Medicine and Dentistry of the University of Rochester will be held at the Strong Memorial Hospital in Rochester, New York, from August 4 to August 8, 1930. The membership will be limited to thirty, and for clinical demonstrations will be divided into small groups. The fee for the course will be $50.00 including luncheons and dinners in relation to the course. The visiting lecturers include Walter R. Parker, Arthur J. Bedell, Conrad Berens, W. I. Lillie, P. C. Kronfeld, and Jonas S. Friedenwald. Application and check for $15.00 should be mailed to Dr. John F. Gipner, Strong Memorial Hospital, Rochester, New York.

The first issue of the new "Ukrainian Ophthalmological Journal", published in the Ukrainian language, contains seven original articles, society proceedings, and other current material. As a supplement the contributions of the Hirschmann Eye Hospital in Kharkov are included. These contain a number of experimental, clinical, and sociological essays which prove that this young institution is making rapid strides in the field of research work. An interesting innovation in the new journal consists of abstracts in German which follow the original articles. These abstracts will be of value to many investigators, particularly if enlarged to contain a condensed translation of the original part of each paper.

The dates of Dr. Ida C. Mann's lectures on embryology were incorrectly stated in the June issue. The lectures will begin in Denver on October sixth and in Chicago on October thirteenth.

Societies

The program of the Colorado Congress of Ophthalmology and Otolaryngology to be held August 1 and 2, 1930, includes the following: Roderick O'Connor, "Ocular muscle action under Sherrington's law, its influence on operative results;" Beulah Cushman, "Tuberculous iridocyclitis;" J. S. Friedenwald, "Pigmentary degeneration of the retina in late neurosyphilis;" H. G. Merrill, "Uveitis associated with parotitis;" A. B. Bruner, "Some clinical aspects of acute glaucoma;" Edward Jackson, "The control of myopia;" L. W. Dean, "The relationship between otolaryngology and internal medicine and pediatrics;" A. M. Painter, "The tonsil question;" T. S. Blakesley, "An operation for chronic dacryocystitis;" J. F. Barnhill, "Are otolaryngologists operating more than necessary?"; Lewis Fischer, " A proven case of brain abscess complicating middle ear suppuration; methods of diagnosis"; L. W. Oaks, "Sphenoidal sinus syndrome".

The German Ophthalmological Society met in Heidelberg on June twelfth, thirteenth, and fourteenth.

The Pacific Coast Oto-Ophthalmological Society will hold its next annual meeting at Victoria, British Columbia, September fourth

to sixth, with headquarters at the Empress Hotel.

The American Academy of Ophthalmology and Otolaryngology will hold its thirty-fifth annual meeting in Chicago, October 27 to 31st, with headquarters at the Sherman Hotel. The guest of honor will be Dr. Emile de Grosz, Budapest, Hungary. The session will open with a symposium on diseases of the paranasal sinuses and their relation to disorders of the eye.

The twelfth annual meeting of the North Dakota Academy of Ophthalmology and Otolaryngology was held at Bismarck, May 27, Dr. George M. Constans presiding. The scientific program included addresses by Dr. W. L. Benedict of Rochester on "Tumors and Pseudotumors of the Orbit", and by Dr. A. D. McCannel of Minot on "Bronchoscopy and Esophagoscopy". Both addresses were illustrated with lantern slides. Dr. H. B. Beeson of Grand Forks was elected to serve as president for the ensuing year. The fall meeting of the academy will be held in October at Grand Forks.

Personals

Dr. Charles Swab of Omaha sailed the latter part of May to spend several months in visiting European clinics.

In May, Dr. Edward Jackson, of Denver, gave a course in physiological optics to a class of thirty-five ophthalmologists in Detroit.

Dr. and Mrs. Howard Forde Hansell, of Philadelphia, sailed at the end of May for Europe, to return in the early autumn.

The Dallas Chamber of Commerce gave Dr. John O. McReynolds a banquet on the evening of June fourteenth, in recognition of his election to the presidency of the State Medical Association of Texas.

Drs. Foster, McKeown, Brinton, and Halsted, of Denver, have severed their relations. Drs. Foster and Halsted are remaining together in the Metropolitan Building, while Drs. McKeown and Brinton have offices in the Republic Building.

Dr. M. Paul Motto, of Cleveland, was married on May seventh to Dr. Helen Margaret Savage. After a motor tour of Canada, the couple returned on May nineteenth to make their home in Cleveland.

Dr. Otis Wolfe, Marshalltown, Iowa, has just returned from a two months' visit with Dr. Barraquer at Barcelona, Spain. He also attended the fiftieth anniversary meeting of the Ophthalmological Society of the United Kingdom, in London.

During the jubilee meeting of the Ophthalmological Society of the United Kingdom, Miss Ida Mann, who will lecture on embryology of the eye in Chicago and Denver during the coming summer, was awarded the Nettleship medal.

The William Mackenzie medal for outstanding contributions to ophthalmology in 1929 has been awarded to Professor J. Van der Hoeve of Leyden, Holland.